

# SUPPLEMENT.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2547.—VOL. LIV.

LONDON, SATURDAY, JUNE 14, 1884.

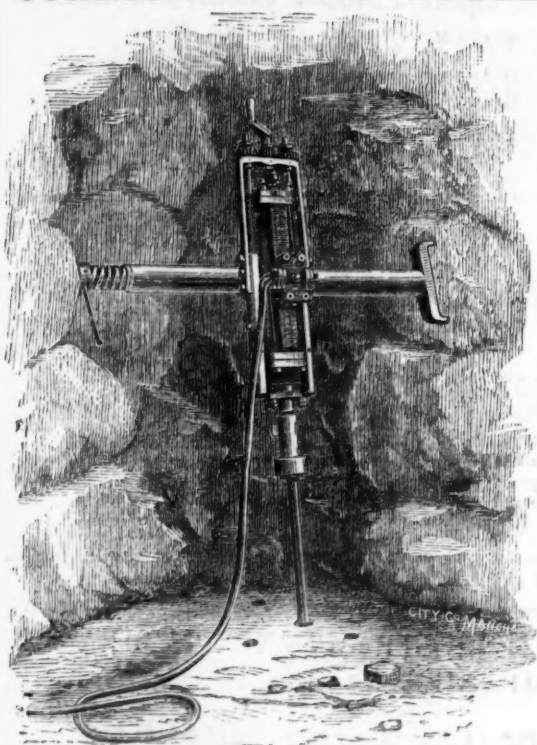
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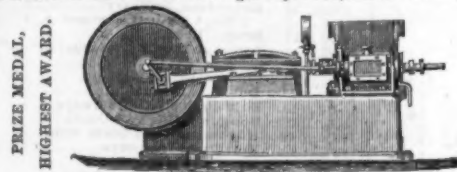
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PATENT  
"INGERSOLL ROCK DRILL."

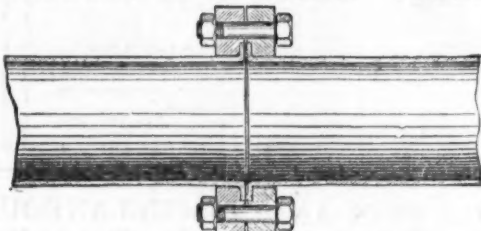
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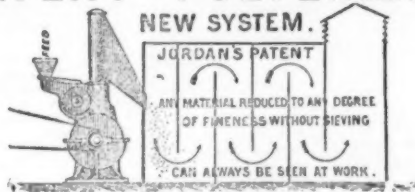
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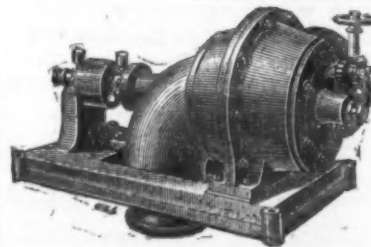
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SYDNEY. 1879.

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FIRST AWARD.  
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SILVER MEDAL OF THE MINING INSTITUTE OF CORNWALL, TRURO, 1880,  
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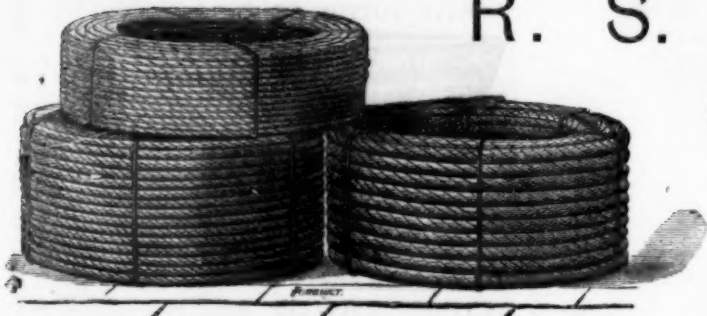
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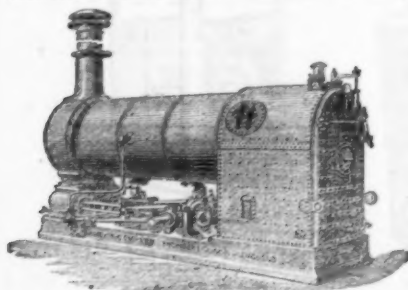
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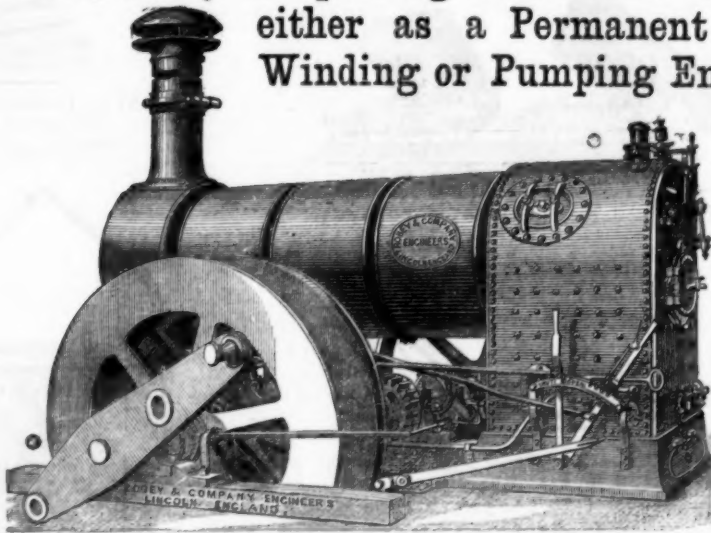


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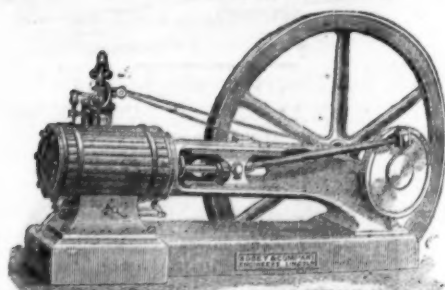
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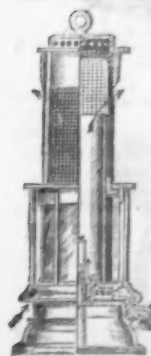


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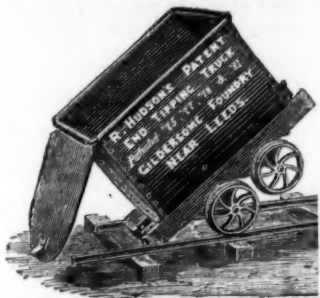
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Telegraphic Address:—  
"GILDERSOME,  
LEEDS."  
A. E. C. Code used.

UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the **LIGHTEST, STRONGEST**, and most **CAPACIOUS** made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.  
N.B.—The American, Australian, Indian, and Spanish Patents on Sale.

**CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.**

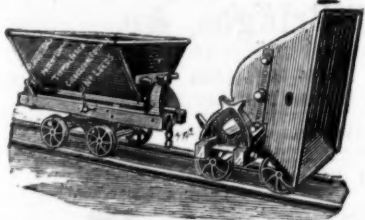
1.—PATENT STEEL END  
TIP WAGONS.



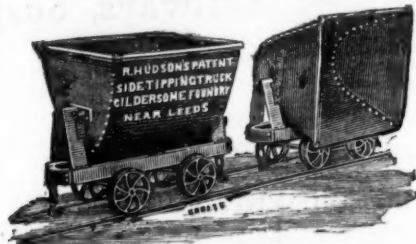
7.—PATENT STEEL MINING WAGONS.



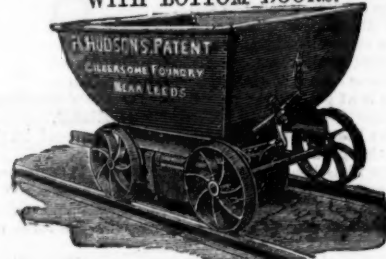
2. PATENT UNIVERSAL TRIPLE-CENTRE  
STEEL TIPPING TRUCK,  
Will tip either SIDE or either END of rails.



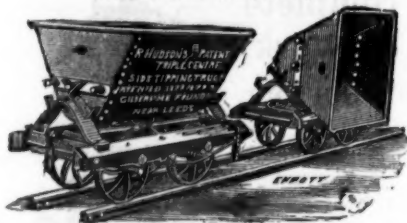
8.—PATENT DOUBLE-CENTRE STEEL  
SIDE TIP WAGONS,  
Will tip either side of Wagons.



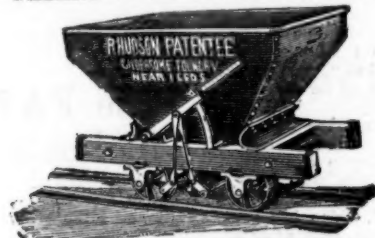
12.—PATENT STEEL HOPPER WAGON,  
WITH BOTTOM DOORS.



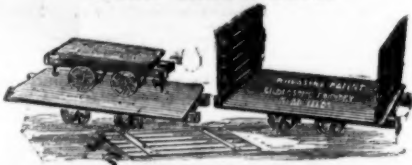
3.—PATENT TRIPLE-CENTRE STEEL  
SIDE TIP WAGONS.



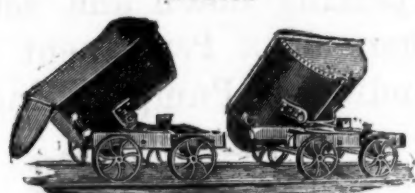
13.—PATENT STEEL HOPPER WAGON.



4.—PATENT STEEL PLATFORM OR  
SUGAR CANE WAGON.



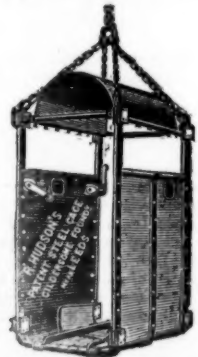
9.—PATENT STEEL ALL-ROUND TIP  
WAGON.



14.—SELF-RIGHTING STEEL  
TIP BUCKET.  
(The "CATCH" can also be made SELF-  
ACTING if desired.)



15.—STEEL CAGE.



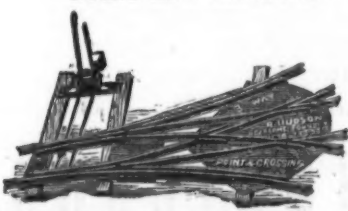
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As supplied to H.M. War Office for the late war in Egypt).  
DOUBLE the STRENGTH of ordinary Casks without any  
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10.—LEFT-HAND STEEL POINT AND  
CROSSING.



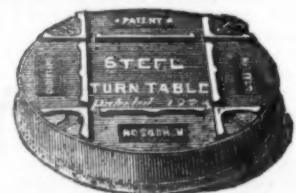
11.—RIGHT AND LEFT-HAND STEEL  
POINT AND CROSSING.



16.—PATENT STEEL WHEELBARROWS.  
Made to any Size.  
Lightest and Strongest in the Market.



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(Also made in Cast Iron for use where  
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NO BRICKWORK REQUIRED.  
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in STEEL, effecting a GREAT SAVING  
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DOUBLE the STRENGTH & much LIGHTER than ordinary Barrow



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# DE BEER'S MINING COMPANY.

CAPITAL £755,120, IN £10 SHARES FULLY PAID UP.

CHAIRMAN—CHARLES DUNELL RUDD, Esq., M.L.A.

## DIRECTORS.

Hon. C. J. RHODES, TREASURER-GEN.  
Mr. FRED. S. P. STOW.  
Mr. ROBT. ENGLISH.

Mr. R. D. GRAHAM.  
Mr. G. W. COMPTON.  
Mr. JOHN MORROGH.

MANAGER—Mr. ROBERT ENGLISH.  
SECRETARY—Mr. NEVILLE E. PICKERING.

HEAD OFFICE—DE BEER'S, KIMBERLEY, GRIQUALAND WEST.

Report of the Directors of the De Beer's Mining Company (Limited), at the Annual General Meeting of Shareholders, held at the Company's Offices, De Beer's, on Monday, 5th May, 1884.

## TO THE SHAREHOLDERS.

GENTLEMEN,—Your directors beg to submit their report on the affairs of the company, with a statement of accounts, for the year ending 31st March, 1884, showing a balance, together with the amount brought forward from last year, of £46,481 17s. 4d.

The actual expenditure on blue ground and pumping contract has been £105,527 19s., and the revenue from the same sources, £209,225 18s. 9d., to which you must add the actual cost of depositing the blue ground and lumps now on the company's floors, amounting to £12,280 1s. 6d., leaving a gross profit, including sundry other receipts, of £117,426 13s. 4d., which has been appropriated in the following manner:—

Payment of dividends .....	£ 52,148 10 0
Removal of floating reef .....	17,187 10 9
Purchase of goodwill of Central Co. lease .....	1,250 0 0
Written off machinery, property, and plant accounts ..	6,013 3 10
	£ 76,598 4 7
And carrying forward for the year a net profit of .....	40,827 8 9

£117,426 13s. 4d.

The amount of work done during the year, as will be seen from the tables annexed, bears a favourable comparison with that of previous years, and the general results show not only a better average yield per load, but also a marked decrease in the cost of production.

Soon after the Annual Meeting, held in May, 1883, the washing operations were discontinued, with the exception of dealing with the accumulation of cylinder screenings (lumps) from the previous six months, as it was found that the exceedingly hard blue met with in the mine would not pulverise rapidly enough to allow of its being washed during the winter months. It was, therefore, distributed on the floors, the quantity at one time reaching nearly 80,000 loads, and it will be observed that the balance of blue ground now figures at 63,029 sixteen cubic feet loads, as against 16,649 loads this time last year.

With a view to more economical working in the mine, the contract system (as stated in the last report) has received your directors' special attention, and though at first, owing to the many difficulties that had to be contended with, notably the necessary introduction of the stripping system among the natives during the cold weather, the visitation of an epidemic disease, and the strike of workmen last October, no very large increase in the output was obtained; still your directors congratulate themselves that the system is now being carried on successfully, and the ground laid down on the depositing floors at a much lower price than heretofore. Further economy is also looked for in the floor tramways at present in course of construction, and the question of how far the contract system can be introduced on the floors is at present engaging your directors' consideration.

## FLOATING REEF.

As will be seen from the tables, the amount of floating reef hauled has considerably exceeded that of the previous year, though at a lower cost.

Much of that removed has been taken from the high and dangerous portion of the Main Block, still a proportionate increment of clear ground has been obtained, and prospecting drives show that few, if any, of the company's claims will be encumbered with floating reef at the present working level.

After careful calculation your directors estimate that the total future expenditure for the removal of floating reef will not exceed the sum of £25,000.

The amount expended during the past year has been written off to profit and loss account.

## MACHINERY.

The expenditure on new machinery and plant for the year has been £7013 3s. 10d., including the construction of a second permanent tramway from the mine to the floors, and also of a patent blue crushing machine. The whole of the machinery, property, and plant of the company, together with that taken over with the De Beer's Central Company and valued at £6000, as referred to in this report under the head of "Amalgamation," has been most carefully maintained, besides which 15 per cent. has been written off for depreciation, and a revaluation this year is considered unnecessary.

## PUMPING CONTRACT.

The pumping contract has been carried on satisfactorily during the year, but on March 29, 1884, the contract was abandoned, the company then undertaking to remove the water from the mine at a lower rate, but reserving to themselves the entire use of such water and stipulating for freedom from all liability.

## DIVIDENDS.

After the resumption of washing operations in September, 1883, the monthly dividend of 1 per cent. was commenced, which has been maintained hitherto and will, your directors anticipate, be continued until October, 1884, after which they recommend a quarterly division of profits.

## LEGAL.

With regard to the action between this company and the Victoria Diamond Mining Company mentioned in the last year's report your directors have to state that the judgment of the High Court was, on appeal, confirmed with costs against the Victoria Company.

## MINING BOARD.

The De Beer's Mining Board still remains in a satisfactory position financially, having a balance on hand of £11,469 13s. 10d. after payment of all liabilities, as will be gathered from the following:—

Balance in bank on March 31, 1884 .....	£5324 3 6
Outstanding rates on March 31, 1884 .....	6992 9 0 = £12,316 12 6
	LIABILITIES.
Sundries at March 31, 1884 .....	846 18 8
	£11,469 13 10

(Signed) J. C. H. BOURHILL, Treasurer.

## INVESTMENTS.

It will be observed on reference to the accounts that the extreme depression on the diamond fields has been taken advantage of by your directors under the powers given them by the amendments to the company's trust deed on July 30 last, and that the following valuable properties have been acquired:—29 claims and 163 square feet of the International Diamond Mining Company; 12 claims and 8 square feet of the Frere Diamond Mining Company, together with their machinery and all other assets on terms detailed in the balance-sheet. Added to this your directors have also purchased the following shares in adjoining companies for a total cost to the company of £9751 5s.—10,791 shares of £10 each fully paid-up of the London and South African Diamond Mining Company (Limited), and 1708 shares of £10 each fully paid-up of the Independent Diamond Mining Company (Limited).

## AMALGAMATION.

In terms of the resolution carried at the last annual meeting, Mr. James Calvert's 2½ claims in the De Beer's Mine were taken into the company, and the capital increased to the extent of £13,570, for which 1357 deferred shares of £10 each were issued; 300 of these were given to Mr. Calvert's principal in exchange for the above claims, and the balance of 1057 distributed amongst the shareholders. Negotiations were entered into in May of last year with the De Beer's Central Diamond Mining Company, consisting of 10 claims and 50 square feet, and a definite offer was made on June 5, resulting in their absorption by this company for the amount of £76,000 in fully paid-up scrip and a cash payment of £1250 to buy out an existing lessee of the company.

Negotiations were also entered into in November, 1883, with the directors of the Baxter's Gully Diamond Mining Company, whose present capital is £82,500, terminating in the absorption of that company in March, 1884, upon terms agreed to by the shareholders of this company at a special meeting convened for that purpose, and which are now being carried out. In the meantime an amount of £1000 has been set aside to provide for the payment of a dividend to shareholders of the Baxter's Gully Company for the month of March, 1884.

In addition to the above your directors may mention that at the present moment negotiations are pending between this company and the Independent and London and South African Diamond Mining Companies which there is every reason to believe will result in amalgamation with those companies.

## GENERAL POLICY.

Profiting by their own experience and that of the Kimberley Mine, your directors have realised more and more daily the absolute necessity for doing all in their power to promote amalgamation, and thus provide for the future working of the mine in an organised manner, and this policy has influenced all their actions; and although these have been characterised by some as coercive, your directors are convinced that they have only acted in the general interests of the mine, besides which fair and in some instances liberal offers for amalgamation have been made by them to adjoining companies.

Your directors are further of opinion that the diamond mining industry can only be carried on successfully under proper and effective searching rules and regulations, and that the future prospects of this company to some extent depend upon the enforcement of these and of the extension of the provisions of the Diamond Trade Act to the Colony and the neighbouring States.

With regard to the working of the Main Reef, your directors have to report that they are opposed to the present system of removing the same, and that immediately an organised plan for underground working be decided upon, the expense connected therewith will be minimised. While on this subject it may be well to add that during the year some considerable falls have taken place, the largest of which occurred last February. This is now being removed.

They have also to refer shareholders to the provisions of the Precious Stones and Minerals Act of 1880, passed since the last Annual Meeting, which are calculated to promote the interests of the mining community generally.

In conclusion, your directors beg to refer you to the statement of accounts herewith.

C. D. RUDD, M.L.A., Chairman.

FRED. S. P. STOW,

R. DUNDAS GRAHAM,

ROBERT ENGLISH,

G. W. COMPTON,

JOHN MORROGH,

Directors.

Kimberley, 31st March, 1884.

Month.	No. of actual working days.	Blue ground.		Floating reef.		Main reef.	Stones.	Ground hauled for other co.'s.	Debris.
		No. of 16 cubic feet loads hauled.	No. of 16 cubic feet loads hauled ex Frere claims.	No. of 16 cubic feet loads hauled.	No. of 16 cubic feet loads hauled ex Frere claims.				
1883.									
April .....	25	11,914	—	5,648	—	—	—	—	—
May .....	27	15,941	—	9,610	—	—	764	—	—
June .....	26	13,208½	—	10,491½	—	—	319	—	—
July .....	26	14,240½	—	10,053½	—	155½	—	—	—
August .....	27	16,114½	—	12,466½	—	—	—	—	—
September ..	25	25,041½	—	1,580½	1,081½	145½	—	—	—
October .....	24	19,130½	—	4,852½	2,306½	—	—	1,403	—
November ..	26	13,682½	—	23,184½	2,008½	—	—	—	—
December ..	25	15,109½	—	22,920	—	1,072	—	—	—
1884.									
January .....	25	19,708½	1,321½	13,361½	—	2,145	—	—	3,770
February ..	25	19,625½	4,637	24,095½	1,828½	1,725	—	—	5,493
March .....	26	13,400½	8,182	29,363½	1,918½	—	11,246½	—	4,632
Total .....	307	194,117½	14,140½	164,337	9,143½	5,243	11,246½	1,113	14,003

\* This includes a quantity hauled on account of the Australian Gully Company, which is now being measured.

Month.	No. of actual working days.	No. of floor loads blue ground washed.	Diamonds found in carats.			Total amount of diamonds found in carats.	Proceeds.	Average price.	
			Daily finds.	Fine sand.	On percentage.			Per carat.	Per 16 cub ft. load.
1883.									
April .....	25	12,022	9,285	1,900	1,206½	12,391½	£11,253 4 9	17/2	—
May .....	27	10,031	9,608	3,205	812	13,825	12,129 15 10	17/10	—
June .....	26	9,100	7,209	2,023	869½	10,934½	9,408 8 0	18/3	—
July .....	26	*Nil.	5,382	800	642½	6,824½	8,261 11 3	24/3	—
August .....	27	*1,228	5,510	892½	565	6,967½	8,808 18 3	24/3	—
September ..	25	13,300	10,694	1,104½	319	12,117½	14,056 6 6	23/2	—
October .....	24	*14,018	13,788	1,222	171½	15,241½	20,067 9 6	26/6	—
November ..	26	*16,185	16,393½	1,827	—	18,220½	21,815 13 2	24/2	—
December ..	25	23,006	15,922	1,848½	504	18,274½	18,073 12 0	19/9	—
1884.									
January .....	25	25,396	17,436½	2,052	824	20,312½	23,798 12 6	23/5	—
February ..	25	29,300	16,566½	1,526	—	18,092½	21,878 0 9	24/2	—
March .....	26	35,120	22,257½	1,735	1,288½	25,280½	28,920 15 3	22/11	—
Total .....	307	118,766	150,051½	19,992½	7,202½	177,246½	£198,168 12 9	22/5	22/10

\* During these months 25,877 loads lumps or cylinder screenings were washed, producing 9114½ carats diamonds. † Off this quantity a discount of 8 per cent. must be allowed for difference between a floor load and a 16 cubic feet load, thus:—

Less discount of 8 per cent. .... 15,100

173,866 16 cubic feet loads.

N.B.—It will be observed that during the first three months of the year the average yield was a little over a carat and a quarter per 16 cubic feet load, the result of washing only blue ground from the deep claims of the company. From July to November lumps and high ground were mixed with the good blue. Allowing, however, for the diamonds found from the lumps, the average yield per load for that period was just over a carat and one-fifth. While from December, 1883, to March, 1884, a very large proportion of the ground washed consisted of poor blue knocked down from the surrounding high claims of the company, reducing the yield for the last four months of the year to 789 carats.

Blue ground on floors 1st April, 1883 .....

Blue ground deposited on floors 1st April, 1883, to 31st March, 1884 .....

Blue ground on floors taken over from Baxter's Gully Diamond Mining Company as per their books, 1st March, 1884 .....

Blue ground washed 1st April, 1883, to 31st March, 1884 .....

Blue ground washed by Baxter's Gully Diamond Mining Co. in March, 1884 .....

Leaving a balance on floors 1st April, 1884, of .....

16,649 16 cubic feet loads

236,695

167,308 16 cubic feet loads

6,358

173,666

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gold mining in this province (Minas Geraes), and exorbitant prices have been realised by unscrupulous speculators, whom I term "boom-bombers" for worthless properties. Descoberto, Gold Hill, India



Gold Mines, Gold Coast, &c., all belong to the same class, only smears to entrap and delude the ignorant and unwary; but if in spite of dear-bought experience the present rage for gold mines continues, there will yet be, and in fact are now, schemes and projects hatching (belonging to the same category) on a grand scale, to prey upon public credulity, heralded into public notice under a long list of imposing names as sponsors, but which if carried into effect I venture to predict will end in disastrous failure and disappointment, because from my own knowledge of mining properties here I am morally certain that the specious promises and extravagant expectations held out in the prospectuses can never possibly be realised. Please observe, I do not deny that these mines are gold producing, but I only wish simply to point out that they are far from being so to such an extent as to justify the exaggerated expectations held out to tempt the public.

It would be well to warn people that before investing their capital in such precarious and risky adventures it would only be prudent to take the precaution beforehand to enquire what are the grounds for entertaining such extravagant hopes, how far these promises are founded on actual facts, and to ascertain the truth of the statements and plausible assertions contained in the flattering tales laid before them, but only calculated to deceive and bamboozle them out of their money; dazzling them with the glare of a big thing, and so inducing them to believe there must be something extraordinary in it from the mere fact of its pretensions and imposing magnitude.

There are mines well worthy of trial here which could be obtained and worked for a very moderate outlay of capital, and very probably would yield a reasonable percentage of interest on it, but if burdened with the heavy profits grasped at by greedy speculators would inevitably break down under a load too heavy for them to bear. For instance mines have been bought here for 4000*l.* or 5000*l.* The speculator goes home, composes and issues a highly coloured and attractive prospectus full of deception, representing his mine as an El Dorado, which will infallibly enrich the fortunate (?) shareholders. Another dodge is to "lug in" the names of some already famous mines in connection with it, but which in reality they have no more to do with than the mountains in the moon. He forms a company, and charges 20,000*l.*, 30,000*l.*, 40,000*l.*, and even more for his mining property. How is it possible to expect any result but failure, unless in very rare and exceptional instances, where a stroke of extraordinary and unexpected good fortune has occurred to save them? The mere name of gold mine has in it something so seductive that people are only too prone to embark in schemes for working them, but as a general rule the produce from them is so scanty in proportion to the expenses that in nine cases out of ten they turn out failures, and end in loss and disappointment. I will conclude with a word of advice to the public, "Be cautious, and make enquiries."

Caché, May 1.

EDWARD W. J. LOTT.

## GOLD MINING AS AN INVESTMENT.

SIR,—Our gold supply in the future, as in the past 30 years, must be dependent on the results of gold mining as a profitable industry; and it may not be uninteresting to draw attention to the question of gold mining as an investment, or the means by which the gold supply can be permanently and profitably maintained. Gold mining must be classed as one of the most important industries of the present day. The industry is based upon such reliable facts, and built on so solid a foundation, that its importance cannot be denied.

The addition to the world's wealth through the enterprise of the gold miners of America and Australasia since the discoveries of gold in those countries in 1849 and 1851 has been nearly 800,000,000*l.* sterling in gold and nearly half that amount in silver, or upwards of 1,100,000,000*l.* sterling in gold and silver. This vast, real, and solid wealth has been raised by a comparative small section of the community, and distributed throughout the channels of finance, trade, commerce, and industry, to the benefit of all who came within its widespread influences.

Our gold supply may be termed a true barometer of the prosperity of the countries in which it is being produced or in which it becomes absorbed by the current of trade and commerce. As population increases, trade, commerce, and industries expand; so it is necessary, for financial purposes, that a proportionate supply of gold should be produced to meet the increasing demands.

Gold mining as an investment, where the operations are economically conducted under the control of practical men, has in the past and is now at the present time proving itself the most profitable of any. It is not of the visionary and shadowy character that many people in Great Britain are led to believe it to be, in consequence of the disastrous failures of the many companies lately formed with the ostensible object of gold mining in India and Africa, through mismanagement and want of practical experience in directing the financial and mining operations.

It is not possible to obtain the returns of the profits made in gold mining generally, but they may be approximately estimated at from 25 to 50 per cent. on the output where the operations have been conducted without waste of labour; but the absolute results of some of the mines now in operation in America and Australia may be taken as a fair criterion of what can be and is being accomplished under efficient local management.

The yield of gold in the colony of Victoria has been about 205,000,000*l.* sterling since 1851, and as one-half of the amount was raised during the first ten years, the profits might be fairly taken during that period at nearly half of the amount raised, while during the latter period the profits might be estimated at from one-fourth to one-third the product, or in round figures (say) from 50,000,000*l.* to 60,000,000*l.* may be estimated as profits on labour and capital judiciously invested in gold mining in that colony.

In the year 1882 the yield of gold was given as 889,535 ozs. at 4*l.* per ounce, equal to about 3,594,140*l.*; dividends from public gold mining companies amounted to nearly 800,000*l.*, or about double that of all the dividends from banks, insurance, and other public companies in the colony, while a number of mines are held by private owners where the dividends are not made public, would probably bring the amount of dividends from gold mining in Victoria to nearly 1,000,000*l.* sterling for the year.

As a further proof of profitable gold mining in that colony I enclose you a list of 21 gold mines whose dividends have not been less than 50,000*l.* in any case, which in the aggregate have amounted to about 6,000,000*l.*, while a large number of very profitable mines are on the list of dividend-paying mines under the amount of 50,000*l.*

While a list of 40 gold and silver mines in America, whose dividends also exceed 50,000*l.* amounts in the aggregate to nearly 10,000,000*l.* sterling.

The following are the yields and dividends from the six principal alluvial gold mines in the Creswick division of the Ballarat district, Victoria, for three months ending June 30, 1883:—

Name of Company.	Yield, ozs. dwt.	Dividends and Royalty.
Ristori Company .....	5540 5	£17,022 8 6
Madame Berry Company...	7067 18	20,221 10 0
Lone Hand Company .....	4357 11	6484 1 0
Loughlin Company .....	1621 3	1702 17 6
Dyke's Freehold Company.	1360 0	2222 0 6
New Australasian Company	4008 19	3750 0 0
	23,955 16	£51,402 17 0

£95,823 4

The above returns show the profitable nature of gold mining where there is a good supply of washdirt, and the water not too heavy, and as two of the companies are only lately in gold their profits will increase as the ground gets more fully opened out. The first two companies have been working in washdirt for some few years, have their mines well opened up, and may be deemed good examples of practical and profitable mining management of the Ballarat system. The Ristori Company, with an original capital of 12,000*l.*, has already paid in dividends and royalty over 100,000*l.*, and, as shown by the quarter's returns, June 30, 1883, on a yield of 5540 ozs. dwt. gold, equal to 22,160*l.* paid in dividends and royalty 17,022*l.* 8*l.* 6*d.*, or nearly 75 per cent. on the output of gold has been profit; or showing an annual interest on the original capital

at the rate of 700 per cent. per annum. Some of the quartz mining companies have been even more successful, paying dividends to the extent of from 250,000*l.* to 800,000*l.* on small capitals from 12,000*l.* to 37,000*l.*, while the list under those sums is a very long and respectable one.

Gold mining is a business that, to be made successful, must be managed by practical men, who have had opportunities of gaining experience in the various phases of the industry at the mines. The results of the late furore in the so-called attempts at gold mining in India and Africa have resulted in a miserable fiasco, as was only to be expected from the manner in which the business and mining operations were conducted.

I have occasionally drawn attention to the deplorable waste of capital and labour in gold mining through the assumption of knowledge by amateurs who imagine themselves competent to advise on the investment of capital in gold mining or the management of mines. Their excited and fanciful imaginations leads them and their friends, who are foolish enough to be guided by their judgment into error and serious losses, for which the mining industry gets blamed, instead of the reckless indiscretion of the adviser and advised.

What are termed losses in gold mining are more imaginary than real. Speculation in high-priced or inflated stock above the legitimate value of a mine must, as a natural consequence, end in loss. So also with mines under defective management and extravagant expenditure in paying for the privileges of prospecting for gold. They also will surely come to grief.

The value of a gold mining property may be appraised by competent authorities in such a manner as to prevent any great loss on the investment, although no set rule can be laid down to guide men's judgment as to their estimate. It is questionable whether any gold mine should ever be valued at more than from two to five years' purchase, thus taking a mine well-developed and paying good average dividends, according to the nature of the matrix operated on; for the mine to be worth a three years' purchase it is necessary that there should not be less than five years' work fairly in sight of a similar quality ore, or the lodes so opened that it affords a fair presumption that such a quantity of matrix can be obtained.

Mines vary so much at times in value and yield that the investor has a right to the chances of improved prospects as may arise, just as he is liable to the reverse by loss. Some of the considerations that should guide the investor in gold mines are, good climate, stable government, liberal laws, accessibility, ample supply of water and wood, and last, but not least, the prospects of a fair quantity and quality of matrix to operate on. With these considerations, under careful management, gold mining is at the present, as in the past, proving itself to be the most profitable industry in the world.

The fields for legitimate and profitable investment in gold mining are practically speaking inexhaustible, and affords ample scope for enterprise, and by judicious investment of capital under experienced direction, there need be little fear of loss, while the profits are likely to be large, as the gold supply can be materially increased by development of the resources at hand.

THOMAS CORNISH, M.E.,  
Author of Gold Mining, its Results, and its Requirements, &c.

## VENEZUELAN MINING—THE CHILE GOLD MINING COMPANY AND AUSTIN IX.

SIR,—I notice in the *Mining Journal* of Feb. 23 a letter from Mr. Garland, secretary of the newly formed company named Nacupai Gold Mining Company, concerning a concession in this country named Austin IX, which has been my own personal property since February, 1883. The pretensions put forward by the newly-formed company, from the letter above alluded to, seem to depend on a decision given by the Superior Court of the State of Guayana, in Ciudad, Bolivar, dated June 10, 1881, when the said Court had no jurisdiction whatever in the mining district of Yurari. This pseudo-sentence was not worth the paper on which it was written, although it was well paid for. From the date of Nov. 23, 1868, until May 3, 1881, the province of Guayana had jurisdiction over the mines in the Yurari district. Before this period the administration had been in the hands of the National Government in Caracas. On Feb. 28, 1881, Edmund Snell was restituted in possession of Austin IX by the President of the Executive Council of Ciudad, Bolivar, (capital of the then State of Guayana) which at that period had jurisdiction in this place. Orders were given to the Inspector of Mines to put Edmund Snell in possession, and this was done. So far as regards the Province of Guayana affairs were carried out legally up to this date—Feb. 28, 1881.

On May 3, 1881, the National Government declared that it had re-entered to the administration of the mining districts of the Republic in virtue of the national constitution appointing and dispatching the Inspector of Mines, and on the 12th of the same month entered into the administration of the district by giving a contract to General Venancio Pulgar, relative to all lapsed mines in the district, and all mines claimed by the Province of Guayana; so that it is apparent that at the first date the General Government resumed the government of mines, and at the second date confirmed its jurisdiction over all mines in Venezuelan Guayana by granting the contract to General Pulgar. It is evident, therefore, that any sentence pronounced in Ciudad, Bolivar, after May 12, 1881, is valueless, and of no effect, and any case brought forward should have been placed before, and decided by, the national tribunals, and not by the provincial tribunals, who after May 12, 1881, had no jurisdiction, and could not give a legal decision appertaining to any mining property in the Yurari district, then separated from the State of Guayana. The facts above stated have been definitely declared in the sentence of the Court of Appeal, given after two previous trials, in my favour on March 8, 1884, in which it is prominently stated that the representatives of the Nacupai Monde Company had definitely lost all right of possession over concession Austin No. 9—firstly, because the sentence of June 12, 1881, was valueless and of no power, as it had been obtained from a Court that had no jurisdiction in the matter of mines in the Yurari district; secondly, that the representative or representatives of the Nouveau Monde, John Taylor, Nacupai Syndicate, Greek Syndicate, or newly-formed Nacupai Gold Mining Company had lost all rights of possession to the concession No. 9, as in Feb. 1883, they did not make appearance or present their titles according to the laws of the country, although summoned to do so in the first action I took against them. This action was an "interdicto de amparo de posesion," that gives the defendant some 13 days to appear and five days afterwards to appeal against any sentence given on the 13th day; and, that having all opportunities they did not appeal against the titles I had produced; this was no surprise for them. The truth is that they had no titles to produce, save the illegal and highly paid for sentence of a court in Ciudad, Bolivar, that had no jurisdiction whatsoever. The representative had entirely neglected to take possession of any of the concessions, which were perfectly abandoned, without any works of exploration, or any boundaries cut, and with every requisite demanded by all the mining codes entirely neglected. At the present time I do not know if any of the Austin concessions in exploitation or any work done, save on the No. 9, which came into my hands Feb. 1883, and which I declared in exploitation at the same date and at once paying the extra Government fees, and putting in work. These Austin concessions moderately well placed in the country have been in the hands of various persons for the last 30 years, without any work or explorations having been made on them of any kind whatever, with the sole exception of the concession that I put in exploration last February, 1883.

Several of Mr. Garland's statements are not correct, but I think and hope that these statements are made through ignorance and not through malice, and are matters that I do not at present propose to treat; but I wish, through the columns of the *Mining Journal*, to advise all investors in South American mines, whether Greeks, Hebrews, Scotch or English, to see that the vendors of the mines present the original titles, or registered copies of the titles of the properties they put before the investing public, and to state, advertising to some expressions in Mr. Garland's letter that might give wrong impressions, that the Chile Company, whose superintendent I am, has been always perfectly advised on all points with regard to neighbouring concessions, and that if the shareholders have been in

ignorance it can only be by the non-publication of my letters since October, 1881. I see that Mr. Garland signs himself in your paper "As Secretary of the Nacupai Gold Mining Company, Limited," I shall therefore hold him or his company responsible for any libel made against me.—Chile, Venezuela, May 10. ALBERT H. NICHOLSON, Supt. Chile Gold Mining Co., Ltd.

## BRITISH MINERS' TROUBLES IN VENEZUELA.

SIR,—In the columns of your widely circulated *Journal* kindly allow me space for the following statements, in order to give the public in general an idea of the manner in which English subjects are treated in the Venezuelan gold fields. These districts are inhabited principally by thousands of people, natives of the British West Indian Islands, who come hither to gain a livelihood; and on them the mining companies depend for miners, mechanics, and labourers. Since the date of their earliest arrivals here they have, on frequent occasions, been subjected to most unjust punishments and torture that, in many cases, are fiendish. Here the innocent victims are treated in like manner with the would-be murderer, even those on whom devolves the duty of maintaining peace, often creating disturbances in order to make arrests and extort fines. Acts such as these have at last become regular occurrences, especially on the pay-days of the different mining companies. On the 18th inst. two men were arrested and confined in the stocks, and fines of 4*l.* and 6*l.* inflicted; fortunately, in this case, the Jefe Civil (who appears to have higher ideas of justice than any of his predecessors) without whose authority or knowledge the arrests were made saw the prisoners in durance vile, and had them at once liberated.

Many will wonder that in this an appeal has not been made to the British Vice-Consul residing in Ciudad, Bolivar. The reason can easily be explained. In the first place, the British Vice-Consul is stationed 200 miles from here. A journey to him and returning would require at least 10 days, during which time the people here would be treated far worse, and the officials here being aware of the fact, would use all means in their power to intercept correspondence. Secondly, until recently, the British Government in Ciudad, Bolivar, was represented by a merchant. In a Republic like Venezuela a merchant subject to the caprice of a fickle Government, and also dependent on the floating capital of the State for a living cannot be considered a fit representative of a foreign power, for he will either have to sacrifice his own interests or see the subjects of the country he represents ill-treated. During the past few years several instances have happened, or wherein the victims were whites, in two of which, statements were sent to their respective Governments, and satisfactory arrangements were demanded and conceded, and the murder of Bushe, the contractor for transportation of mails and bullion, in 1878, was so cold blooded, that even the Venezuelans determined to avenge the murdered man. Some were influenced by the tempting reward of \$10,000, offered to the captors, others actuated by the great respect in which the deceased was ever held. Referring to the outrage on British subjects in the village of Chilli on the evening of the 9th inst. I will state a few facts relative to the cause and its effect. Early on the morning of that date a full-blooded Venezuelan negro was riding to and fro in the village assaulting every British subject he happened to meet, several of whom he knocked down. At about three o'clock P.M. he had abandoned his animal, and was continuing his lawless acts on foot. Eventually he struck an unoffending English negro on the head with a lance-pole, knocking him down and inflicting a severe wound over the left ear. In this case the negro, not inclined to receive such treatment quietly, retaliated, and the native soon measured his length on the ground. Other natives standing near, and armed with swords and lances, rushed on the defenceless negro, who would soon have been murdered had he not been assisted by other negroes, who attracted by the sight came and released their friends. The natives then in a body rushed on the English negroes, but were soon glad to make a hasty retreat, the only weapons used being common walking-sticks; and while some of the negroes were pursuing the original native offender, in order to bring him to justice (the authorities made no attempt to arrest him, rather aiding his escape), they were fired upon by the natives. A young Englishman (native of Bristol) having heard the tumult, went to ascertain the cause of the firing, and in doing so received a wound on the back, inflicted by the outlaws of one of the native police. On looking around to see his assailant he received another blow obliquely across the forehead, felling him senseless, and leaving the skull, by a dangerous wound 4 in. in length, exposed to view. Many natives who call themselves gentlemen (their credentials being that they rose from low-class peons, or menials, to their present abundance of ignorance, arrogance, and wealth) were eye-witnesses to this assault, yet rendered no assistance. Soon after this the English negroes retired to their various homes, and all disturbance ceased. In the meantime two native shopkeepers went from here to the villages of Peru and Callao, assuring the natives there that the English subjects in Chilli were slaughtering all their countrymen. Many of the natives residing in those villages, after arming themselves with fire-arms, swords, and lances, hastened to Chilli, where they arrived at about 7 o'clock P.M. Then began one of the most fiendish outrages of any modern history; harmless and defenceless British subjects sleeping in their quiet homes were compelled to flee to the adjacent hills for safety, and in so doing many were shot at and dangerously wounded. Even rooms that had been deserted when firing began were broken open, and sums of money and all kinds of wearing apparel found were divided among the rabble, which constitutes the Venezuelan soldiery, and anything of no use to them was destroyed. This state of affairs lasted until midnight, when sentries were placed at the most convenient distances throughout the village, and every negro that was seen became at once a target for the sentries' bullet. Some of the officers of the company coming to perform their duties at midnight were told that if an attempt was made at a return to their rooms they would be shot indiscriminately, as the orders for the night were to shoot and kill. Early on the morning of the 10th inst. the governor and a large crowd of generals and soldiers arrived in Chilli from Guacipati, a small town some 30 miles from here, and the official headquarters of the mining districts. He at once began a so-called investigation of the previous day's events. An investigation, according to the views of all civilised nations, means a minute search for truths regarding a cause and its effect, but when the investigations have arrived at a foregone conclusion, as was the case in Chilli on the 10th inst., I am at a loss to apply a fitting term.

It was, saying the least, a disgraceful fraud on the part of the Government officials, and a worthy imitation of the course, that is very commonly pursued by the arrogant champions of justice in the State of Guayana, Venezuela. The primal agent of the disturbance was not examined, and his actions were ignored; and in fact during the trial he, with a few other vagabonds were searching for persons in concealment. After a hasty trial, lasting some four hours, a large number of prisoners were lashed together in such a manner that many cried out in pain, and marched to Guacipati, charged with attempting a political revolt. Among the prisoners were two women, one bearing a babe a few weeks old. After the trial was over the Governor told the Jefe Civil (who represents him in his absence) to arrest all parties in hiding (two in particular), and send them or their decapitated heads to him in Guacipati. Such were the final instructions of the highest Government functionary in these districts on leaving Chilli on the evening of the 10th inst. For many days after the Government officials in Chilli continued making arrests, sending a few to Guacipati, and in all other cases, where no fault could be found, after a severe sword-lashing, and an extortion of 5*l.* fine, the victims were at last released. The number of so-called political prisoners at present in prison is near 60, many of whom know nothing of the events in Chilli on the 9th inst., they having gone to the village of Callao, six miles distant from here, and were arrested on the 12th inst., while returning to their work. Many of those poor fellows are dangerously wounded, having been perforated by rifle balls, besides receiving lance thrusts and sword wounds on various parts of the body. Many of the soldiers boastfully assert that some of the negroes are dead in their places of retreat, for they were seen to fall when shot. Such is the unvarnished tale of the political revolt in Chilli, the results of which are anxiously waited for by the poor prisoners in Guacipati and others in hiding, not venturing out for



fear of being shot. The origin of this outrage is an illiterate vagabond, and had he been confined in the stocks for his first, or even last assault, nothing further would have happened. Nearly all the English negroes in the village of Chilli are natives of the Islands of Grenada and St. Vincent, British West Indies, and the natives of those islands are noted for their quiet habits. The natives living in Chilli are of the lowest classes (with the exception of one or two merchants), who, too indolent to gain an honest living, spend all the time that exhausted nature does not demand in the numerous gambling rooms of the village. If such persons assume to be the champions of politics in Venezuela, an intelligent public will think that the political career of this Republic will soon be a thing of the past.

The idea of a political revolt never entered the heads of any of the English subjects here (for we have no arms of any kind), and such ideographic tales are only myths, fabricated in the minds of the natives, who, having outraged the laws of humanity, assume this ostensible reason, thinking thereby they will not have an account to render to that flag now waving in the winds of every clime. Since the much-regretted events of the 9th inst., Mr. Redan, appointed British Vice-Consul in Ciudad, Bolivar, some months since, has arrived here and holds daily investigation regarding the so-called revolt. On the evening of the 10th inst. an unfortunate calling himself a Corsican was foully murdered in Callao, the only fault that he was a stranger, regarding which statements have already been forwarded to the Government of France. On the evening of the 27th inst. an English subject—only surviving male representative of one of the most respectable families in the Island of Dominica, B. W. I., was murdered in the village of Peru. The statements herein made are facts which can be avouched for by hundreds of English subjects. And in the veins of some of these subjects flows the loyal blood of three centuries. There are unfortunately some two or three instances in which English subjects may differ, but in these parties are ever seeking their own aggrandisement, and give publicity to opinions for which they have no foundation, irrespective of the welfare of others, and calumniate their countrymen without compunction. But in these cases the parties are similar to him in ancient times who built his house upon the sand. In conclusion, I will advance a few remarks concerning the State of Guayana, Venezuela, and its resources. The States welfare depends entirely on the foreign capital invested in it—British, German, French, and American, and in the mining districts, 90 per cent. of this capital is British, and as yet only the small space of 12 miles in an area of thousands are explored. As far as the virgin forest grounds have been trodden by the foot of man gold has been found in paying quantities, both in alluvial deposits and in quartz veins, and not only is mineral wealth abundant, but the soil on the various mountain slopes and banks of the numerous rivers extremely rich, and capable of producing all kinds of produce in abundance. There are also vast tracts of grassy savannah land where herds of cattle can be reared with facility. So it can be seen by a glance what vast inducements are here held forth to enterprising capitalists of all nations. The fate of the prisoners in Guacipati will be matter for further correspondence.

I, superintendent of the Chile Gold Mining Company, certify to the truth of the above statements but for many reasons that have effect in this country. I do not wish the names of the writers to appear in print. You can use my name should you think fit.

ALBERT H. NICHOLSON,  
Superintendent of the Chile Gold Mining Company (Limited).

#### PERSONAL PROFITS—THE PRIMARY INCENTIVE TO MINING—No. IV.

SIR,—A mining property, or indeed any property, may be purchased at a price and sold at another highly advanced price, with no injustice whatever to the last purchaser. Such may be the case from a variety of considerations too well known and too easily understood to require specification in this discussion. Property may advance in estimable and market value independently of any outlay for the purpose of its improvement or the development of its resources, whilst in the absence of either differences of price in the purchase and sale of properties is a commercial necessity. To buy at one price and sell at another and higher price is essential to the sustenance of trade, and the life of business; but the difference of prices in the purchase and subsequent disposal of the seven properties in the Transvaal, referred to in a former letter, is wholly disproportionate to all and every such consideration. Besides it is not to be presumed from the information supplied that it is to be accounted for from an increase of values consequent on the extended development of their resources, as nothing of the kind so far as I am aware of has been, and this is the most vital question to be considered—ought not a very large part of the balance of difference of the purchase and sales in question amounting to 698,598*l.* to have remained in the pockets of the present proprietors. In what consists the luxury of paying such enormous premiums for the privilege of experimenting on a doubtful enterprise, or indeed for any enterprise of mining.

Why not purchase such properties on the spot from the original owners, personally or through an accredited and trustworthy medium, or is the trifling difference of upwards of two-thirds of a million pounds sterling of little or no consequence in comparison to the convenience of taking hold at once of a cut-and-dried scheme. I do not discuss the merits or otherwise of the schemes in question on personal grounds, or because of their novelty, as novel they are not, but because they are recent, and of a class which I deem pernicious to the interests of capitalists and of legitimate mining. If the properties from practical inroads made into their recesses had developed values commensurate with or approximating to the difference of their first prices, and those at which they were subsequently disposed of to English and other capitalists nothing would remain to be said reprehensive of the proceedings except that it may still be asked—why is it that investors do not purchase—at least—some of the better class of mining enterprises at their incipient stages, and at their first cost. The objection that they would thereby subject themselves to the cost of development, and the uncertainty of success is not a valid one as many properties are purchased at progressively advanced rates from a mere change of hands from one to other parties successively, independently of any mechanical or developed improvements whatever. How is it that the highest artificial rates are so generously subscribed for on the formation of companies for the purchase and working of such enterprises. If no practical developments are made or mechanical facilities, provided by way of improvements, with a view to such development, to what extent can a mining property enhance in value, except from fortuitous occurrences, such as the cheapening of labour, a reduction of prices of mining machinery and material, or an advance of price of the actual or prospective products. Is the artificial code of estimating values from pure assumptions a more alluring and captivating process than the contemplation of natural phenomena in the light of universal practical experience and the lessons it is its province alone to teach? Substantially successful mining must have its roots not only founded on, but consonant with, the laws of the empire to which it belongs. Metallic wealth has its sources, or had them, until the maturity of its being, the perfection of its nature was attained. Why ignore the fact: it is analogous with Nature universally, whilst to recognise her modes is to respect her authority and teachings, and not only so, but Nature study has a reflex action and effect.

If metalliferous minerals grow on stalks like cauliflower do they might be sought for on the surface of the ground, and even then could not be reasonably expected to be found in very great abundance, except from seeding and planting. But metalliferous minerals and metallic substances of every kind are products of the rocks, and peculiarly of certain classes and conditions of rocks known to some persons, and not even dreamed of by others. If properties do not enhance in value in passing from hand to hand from the original owners onwards—as they do not without an expenditure of labour or money, and nothing is added to augment their value the difference of prices at which they were originally purchased, and subsequently disposed of to companies goes out of the concerns, and for which no compensating value is received.

The organising of companies is not an expensive process, nor need their purchase be through a proper medium. That such agency

where employed should be properly compensated no one would deny, but then it should be no more than the compensation of an agent for services rendered.

There are properties in the market in different stages of development, some more advanced than others. They are for disposal, their owners not having the means to work them thoroughly. They offer them for full development to capitalists, and on terms in some instances which seem to be appalling from their modesty. An erroneous view is taken of the situation, because they are offered on easy terms; the presumption is that they are of inconsiderable, if even of any value—whereas the reverse would be the correct view. If properties are offered on lease at a fair royalty or a reasonable share of the profits, on which considerable money has been expended, and substantial valuable improvements effected in an increase of intrinsic values, accompanied by a widening and strengthening of the prospective outlook, what better evidence can be adduced of the high estimation in which such properties are regarded by their owners. Besides, where do the best mines come from if not developed from pristine conditions through much obloquy and vicissitudes to the climax of their fame and prosperity. "If the child is father to the man" so is the juvenile mine to the mine more—nay, most advanced, and are certainly the class of mines from which the most money is made with the least possible risk. Well-selected young mines, such as I know of this country, which can be procured on terms as indicated above, can scarcely within the limits of rational possibility fail of success, some greater than others, of course; but each and all, if properly developed, are morally assured of success, or are ample returns for investments from the ordinary natural channels of less value appreciatively than from market speculative operations, where what one gains another or others lose. Is it the feverish speculative part only that imparts a relish for conventional mining, for mining in its proper acceptance such is not. Capital proverbially is sensitive, but practically very frequently it is not; but quite the reverse. Its economy would mean the largest actual and prospective returns for the smallest amount invested, whereas disproportion between the outlay and probable income, or the sources from whence it should be legitimately derived, if derived at all, is scarcely if ever thought of.

Ione, Nye County, May 22.

ROBT. KNAPP.

#### AN ICE-MAKING COMPANY FOR BRISBANE AND QUEENSLAND.

SIR,—I would call the especial attention of readers of the *Mining Journal* to the splendid opening which exists in Brisbane for the investment of a few thousands of English capital in the manufacture of ice. In this place ice is a necessity for the sick, a comfort for the sound, and highly and economically useful in the production of needful articles like butter, &c. Brisbane has a population of some 35,000 souls, and the back country (in railway communication with it) has some 95,000 more, including dairy folks; and these 130,000 people are, perhaps, as prosperous, wealthy, and well-to-do on the whole as any other 130,000 people in the same walks of life on the face of our globe; and the climate and mean temperature of Brisbane and its back country (as tapped by the railway to Roma) are represented by and similar to those of Madeira, Algiers, and Cairo, where for six months in the year all white people need ice. As before stated, our 130,000 people are not Egyptians, Hindoos, nor pauper negroes of any kind, but they are able to pay for ice. They want it badly, medically, domestically, and commercially, and they cannot get it, for the present and past production of ice in Brisbane does not fully supply even the hotels, leaving the sick folks and children, the fruit and cake shops, the healthy general public in Brisbane and up the line, and the dairy people (not "out in the cold" but) out in the heat altogether, for not 1 cwt. is available for them even at 1*s.* per lb. We have reformed our steamer communication with the outside world; we have reformed our banking accommodation from its old Sydney groove. It was done, and at once, by simply letting the English world know of our wants and the field that awaited capital here. And in the matter of ice, which will yet play a great part in Queensland, and her manufacturers, and health, wealth, and progress, the facts I have here arrayed only need placing properly in the proper quarter in London, and we shall soon have outgrown our present ice shackles, as we have already outgrown our old steam, and banking, and insurance ones.

It would take up too much of your space were I to narrate even some of the scenes I have witnessed in this line; buggies of wealthy merchants and civil servants waiting in a string outside and inside the gates of the local ice works, the owners willing to pay any price per pound for ice, and to fetch it away as well, and yet none to be got. A shareholder of 400 shares wanted six blocks, and had his buggy ready to fetch it; he had to be content with half a block, while non-shareholders (rich or poor) had to go without. Nearly 100 people died in Brisbane this last summer whose lives might have been saved by a timely and plentiful supply of ice, and the fish and the butter that were lost amounted to thousands of pounds. The pursers of the British India Company's steamers trading to Brisbane from London can certify to the wretched non-supply of ice in Brisbane last summer for their boats, notably the Belimbi, Almira, Dornada, and others. But I think I have said enough to draw attention to this unquestioned opening for capital, which opening has existed for years past, and was especially brought home to us during the past terrific summer heat in Queensland.

Brisbane, April 26.

N. BARTLEY.

#### DIAMOND MINING IN AUSTRALIA.

SIR,—Some 10 or 12 years back a few small diamonds were washed out along with alluvial gold at Bingera in this colony. Now and again a few were found since, but it is only lately that any really business-like method has been brought to bear upon the working and washing, and as the results, so far, give good hopes for yet much better results, I subjoin the latest account of the mines and results. It is remarked that certain districts of this colony are diamondiferous has been pretty widely known for many years past, and the diamond mining now being done near Bingera is of interest to all the colonies. Some time ago a Mr. Rogers called upon Messrs. P. Falk and Co., diamond merchants, Melbourne and London, and made such representations to them that they purchased from him, for 3500*l.*, about 80 acres of ground, situate seven miles from Bingera. A syndicate was formed, and the following account of its operations has been given us by Mr. C. S. Paterson, one of the directors. The Australian Diamond Mining Company, as it is named, sent up two experts to test the ground, one of these men having gained his experience at the Cape diamond fields. They obtained about 300 diamonds, which were transmitted to Falk and Co., London, and on receipt of them the members of the firm at once wired to the Melbourne branch that the stones had been tested and found to be of excellent quality, and that they had a market for as many as could be supplied.

A diamond washing machine was sent up to Bingera, and work was commenced in earnest. A shaft was sunk, and after about 3 ft. of surface soil was taken off, the diamondiferous stratum, yellow clayey soil, with occasional streaks of blue slatey formation, was reached. This has been excavated to the depth of 6 ft., and two washings have been held, the result on both occasions being the same, a return of 2½ carats to the load—a yard square of washdirt. But all this stuff had to be carted a distance of three miles to the River Gwydir, as there was no water at hand, and the company had almost entered into a contract with a Melbourne firm to lay pipes from the Gwydir to their mine, and erect a pumping-engine at each end, when at 80 ft. in a well they sunk a plentiful supply of fresh water was struck, and so in future washing will be carried on at the mine. By this 5000*l.* of proposed expenditure will be saved to them. Mr. Paterson, Mr. Thomas McFarlane, jeweller, of Sydney, and several other members of the Australian Diamond Company, have formed a second company, and acquired 240 acres; and a syndicate formed in London is in treaty for a portion of this at a very high figure. Now that water has been got by boring, other parties intend to commence diamond mining, and the result of the Australian Company's next washing, which will take place within the next two months, is awaited with interest. Mr. P. Falk is the local director at Bingera of the Australian Diamond Mining Company, and the manager is Mr. Barnes, who, Mr. Paterson informs us, has had 10 years' experience at the Cape diamond fields. Mr. Paterson showed us yesterday about 40

diamonds of a size from which brilliants could be cut, and 5 ozs. of very good gold, these being part of the result of his company's last washing. It is intended to erect larger machinery, and push on the development of the mine as rapidly as possible, as the diamonds increase in size and number as the wash is followed down.

Since the above was published the following telegram has come to hand from the local (Bingera) correspondent of the Sydney Mining Herald:—Two parcels of diamonds, numbering over 400, have been taken out of the last washings at Falk and Company's ground. Mr. C. S. Paterson took one parcel to Melbourne, and the last lot will be sent to-day, which are more uniform in size than those taken out some time ago, besides being excellent in quality. There is 300 ft. of water in the shaft, and washing operations will now be transferred to the mine, thus saving all cartage thither when the engine and larger machinery arrive.

My old friend the late Rev. W. B. Clarke, the most eminent geologist Australia has yet produced, always predicted that diamonds of mercantile value would be found when properly mined for, and amongst other likely places mentioned this very district. R. D. A.

Sydney, April 26.

#### AUSTRIAN GOLD AND SILVER MINES.

[TRANSLATION.]

SIR,—I have noticed in the *Journal* several letters respecting the gold and silver mines of Ober Kärnten (Upper Carinthia), and trust you will favour me with space to make a few remarks on the subject. I have for many years studied the deposits of ore in this district, and can vouch for there being mineral veins of great richness that would yield very considerable profits if worked as they should be. Herr Carl Rocheta, who has made an extensive survey of the district, has found that there exists an immense number of old gold workings, in addition to lodes and veins containing auriferous quartz, auriferous and argentiferous copper pyrites, and argentiferous galena, and that even the refuse heaps could be worked at a profit.

History proves that in the 15th and 16th century these old works were successfully worked by the Protestants, and only ceased when they were driven away; if, then, at these early times mining flourished and paid large dividends surely it would pay now if worked with modern appliances. In years gone by Kärnten, or Carinthia, was the seat of the most important mining in all Austria, and the reason for its neglect now is not clearly indicated. I could point out to investors the many advantages that Carinthia possesses; among the most important is the water-power, the cheapness of material, and the low price of labour. The existing water-power can be made available without trouble, and there is water near every mine; steam-power is nowhere necessary, timber is abundant and ridiculously cheap, labour costs only 1*s.* to 1*s.* 6*d.* per day.

The projected Tarn railway will come very near the mines, and it is expected that the tunnelling necessary for the line will lay bare many important mineral veins hitherto unknown. I am in no way connected with these mines, and have no interest prospectively in them, but I have an acquaintance with their riches, and certainly capitalists have invested in properties that have no comparison in riches with these.

It is to be regretted that the Austrian Government is not able to do anything for re-examination of these mines, but, as the world knows, with a deficiency of income, the Government is forced to the strictest economy. In 1879 the Austrian Government was petitioned with respect to this. The Secretary of Agriculture, in communicating the official refusal, pointed out the revenue deficit, and remarked there was no fund to be employed for such purposes, in fact they were unable to carry out their programme respecting the States' mines. But if the State can do nothing, private capital can do much. Money is scarce in Austria; wherever we look, in every branch of industry and commerce, we find foreign capital invested, and I trust before long I shall hear that men of energy, the agents of foreign capitalists, are at work in the gold districts of Carinthia.

Scalnak, Hungary, May 31.

E. T. K., M. E.

[An Austrian State Official.]

#### GOLD AMALGAMATION.

SIR,—Since very early in the morning of man's consciousness he must have had a sort of hankering and a more or less industrial search after gold; for before we reach the 50th verse of the book of Genesis we are introduced to the "land of Havilah, where there is gold," and the first mineralogist of the time recorded "the gold of that land is good." Probably it had been very much waterworn in previous ages in the River Pison, and, therefore, contained less silver, and was, of course, sundry carats finer than the gold found elsewhere within reach of a limited company's observation. However this may have been, certain it is that from a very remote time-period until now this root of all evil, gold, "Bright and yellow, hard and cold, Molten, graven, hammered, and rolled; Heavy to get, and light to hold;" has been "Hoarded, bartered, bought and sold, Stolen, borrowed, squandered, doled; Spurned by the young, but hugged by the old To the very verge of the churchyard mould." And, most likely, will continue thus to the end of the very last chapter of man's earthly history. And no wonder. It is the most splendid of metals to look at. It is pleasant, rather, to handle. It is obstinate in refusing to be destroyed; yet it amiably yields to melting moments without appreciable loss. It is not particularly reticent, for it allows one single grain of itself to be drawn out into a wire 500 ft. long. Further than this, it will permit anybody who knows how to hammer out another solitary grain into leaves so thin that a pile of 28,200 of them will only equal 1 in. in thickness. There seems actual sovereignty in this fact. In effect, the specific gravity of gold is thus rudely thrust from about 19 to nothing; for if this thin gold-leaf be rubbed dry, and thrown upon still water it will not readily sink, and if cast upon water in onward motion it will float away, with but small chance of being found again after any number of days. Such is gold in a few of its royal aspects and caprices. It cannot be denied that gold looks exceedingly well after civilisation has put a recognition stamp upon it for standard measures of value; but, alas, in its natural condition, before it arrives at this phase of respectability, the low, base, and intractable company it often keeps is something unspeakable; and its economic acquisition is, therefore, just as often a matter of great difficulty as well as of importance. Everybody almost knows this, and the said everybody is sharply and wisely on the alert to discover the best means to that end. To get gold from its very varied matrices is the object in view. How? That is the question. Chiefly by amalgamation with quicksilver is the undoubted answer. Therefore, all information on this head is duly appreciated by all who are directly interested in the subject; and they are not a few, and your valuable *Journal* lately, thereupon, has been of special interest.

In what may follow I beg distinctly to state that I hold to my oft-repeated text as to gold-getting machinery—namely, "That is the best machine or process which gets out the most gold, in the least time, at the least cost." Your notices last week and this refer particularly to Messrs. Barker and Moon's patents, the first of which refers to the treatment of gold ores by electricity and the other by pure quicksilver only. In an article of mine, p. 675, my own process is alluded to, in which I employ a vortex of water, and beneath it what I call quicksilver for distinction sake.

On page 629, under heading "Oscar Gold Mine," is a statement that 1½ ton of quartz from it had been crushed by Mr. Claudet, the coarse gold taken out, while 16 dwts. had been extracted from 1½ cwt. of the sieved ore, which was equal to about 9 ozs. per ton. Also that 7 cwt. of the sieved ore had been treated by Moon's amalgamator. The assay before being put in the machine was 10 ozs. 15 dwts.

In last week's *Mining Journal*, on page 651, Mr. Gossett states with reference to the trial of the 7 cwt. of the Oscar Company's ore by the Quicksilver-wave Amalgamator:—"The ore contained over 10 ozs. of gold per ton before treatment, and the amalgamator save 1 98 per cent. of the gold." Messrs. Johnson and Sons' certificate of a sample of the tailings on assay being 2 dwts. 12 grs. of fine gold, and 2 dwts. 12 grs. fine silver to the ton of 20 cwt. On page 657 is a paragraph, emanating apparently from the Oscar Company, in which it is stated with reference to the above-mentioned trial "the result has been a nugget of gold weighing 2 ozs. 17 dwts., equal to about 9 ozs. per ton." Mr. Claudet's assay of the tailings gives at the rate of 6 dwts. 12 grs. (gold) per ton."



Now, it would appear by the simple rule of proportion that, if 7 cwt. of ore yield 2 ozs. 17 dwts. of gold, 20 cwt. of the same quality would yield only a little over 8 ozs. of the coveted royal metal.

From the above data we have:—

- (a) As regards the ore itself,
  - 1.—No description of the ore, as to whether it contained sulphides, &c., or not.
  - 2.—Statement on page 629 that the ore before treatment held on assay at the rate of 10 ozs. 15 dwts. of gold per ton.
  - 3.—Mr. Gossett's statement that on assay it held over 10 ozs. per ton.
- (b) As regards the gold yield:—
  - 1.—The amalgamator's statement, 98 per cent. of the assay value.
  - 2.—The Oscar statement about 9 ozs. per ton.
  - 3.—Whilst the calculated yield is only a little over 8 ozs. per ton.
- (c) As regards the tailings after treatment:—
  - 1.—By Messrs. Johnson and Sons' assay 2½ dwts. gold, and 2½ dwts. silver per ton.
  - 2.—Mr. Claudet's assay, 6½ dwts. of gold and no silver.
  - 3.—Editorial note (p. 656) that Claudet's assay is 150 per cent. higher than Johnson's.
- (d) As regards the time taken for the operation, no mention.

N.B.—How are these statements to be reconciled?

London, June 9.

T. A. READWIN, F.G.S.

#### TREATMENT OF GOLD AND SILVER ORES BY ELECTRICITY—BARKER'S PROCESS.

SIR,—I notice in last week's *Mining Journal* an article on the above subject translated from a Vienna publication. As I have had some opportunities of examining and experimenting on this process will you kindly permit me to make a few remarks. I quite agree in the main with what the writer says on the subject, but there are one or two points which I think require some further explanation, particularly in this case with the second set of figures which he gives, and from which it would appear that in these experiments the effect of the process was practically nil. This might lead to the conclusion that the particular classes of ore employed were unsuitable for treatment by the process, but a far more probable explanation is that the electrical arrangements were imperfect, for it is found that much depends both on the arrangement of the electrodes and the strength of the current; if these were unsuitable it quite accounts for the negative results obtained. Again, the figures in themselves seem to me improbable, for neglecting the action of electricity altogether it appears in the highest degree unlikely that an ore like that of the Felsö-Banya, carrying 25.3 grms. of free gold, should pass over a series of riffles of clean mercury without one particle becoming amalgamated!

In a case like this it is unsafe to draw conclusions from experiments made only on a small scale; they must be conducted on a fairly large scale and extend over a considerable length of time in order to make any fair comparison between simple amalgamation and Barker's process, for when starting with fresh mercury there may be very little advantage gained by the use of the electricity. It is when considerable quantities of ore have been passed over the table that the effect begins to tell, for with simple amalgamation the surface of the mercury becomes covered with a gradually thickening film of impurity, and is in consequence less and less capable of taking up the passing gold, so that the mercury often requires retorting long before the point of saturation is reached. With the Barker process this film is entirely prevented, and the surface kept bright up to the last, thus avoiding the waste and expense of distilling the mercury so often. Whatever may be the merits of the process in respect to the treatment of pyrites or of rusty gold, &c., there is certainly no doubt of the fact that it keeps the surface of the mercury wonderfully clean, and also prevents the loss occasioned by the finely divided and sickened mercury being carried away by the water. Admitting this advantage it is desirable to enquire what the cost of application is likely to be.

The cost of a suitable dynamo is about 50%, and if water or steam power is at hand another 50% should cover the cost of fitting up the necessary arrangements. The dynamo will take about 2½-horse power to drive it, and will supply enough current for at least 10 tables, and with these some 40 tons of ore could be treated per day, so that working 12 hours per day, and taking the cost of engine power at 1d. per horse power per hour we have—

12 × 2½ × 1d. .... = 2s. 6d. per day.  
Interest on 100% at 12 per cent. = 0s. 8d. per day.

3s. 2d.

or 3s. 2d. for treating 40 tons—that is, less than 1d. per ton.

EDWARD H. LIVEING, Assoc. R.S.M.

Westminster Chambers, June 10.

#### BRITISH ENTERPRISE IN BRAZIL.

SIR,—The only matters of much interest to your readers from this part of the world, are those connected with the Ouro Preto Gold Mines of Brazil and the St. John del Rey Company. These two companies and the Santa Barbara represent the foreign interests in mining. The first-named company take over the four mining estates which were worked by a French syndicate, and all the particulars have been set forth by the prospectus of the new company. The company make a fair start. Three of these properties are being worked with good results. The works are not extensive, but they are doing what they intended from the start to do. They prove the ground step by step, and each day some gold is produced, while the development of the mines is progressing. At Raposos there is above the highest adit an immense quantity of low grade ore. The adits, three in number, are being run at convenient distances from each other for ventilation and for stopping, several ore shoots have been cut in the upper two adits, one of these gives ore worth nearly an ounce per ton for the entire body. The adit opened on it, out it near, say 70 ft. from the surface, and it has been worked some 20 ft. below. It is apparent from the outcrop and from extensive surface workings by the ancients, than the main lode or larger shoots are beyond the forebore of all the adits, and there is abundant reason to believe that there will be a supply of ore to be had when the deep adit is in, even beyond the expectations of the proprietors.

One very important fact is proved beyond question. The accounts of this mine, running over 12 months time, show that the low grade ore run through the mill as it came from the mine, has paid about 75 per cent. of all expenses, including "dead work," that is the work in the adits not giving ore, timbering, construction of several houses for miners, making roads, administration, &c. This has been done with 18 stamps and no retreatment of the sand. The accounts show conclusively that 1½ ozs., or 13s. per ton, will pay all the legitimate expenses of mining and milling the ore. I will add, 18 stamps have been run five months, and six stamps, seven months, and ore to supply 40 stamps is in sight. Since the company took hold, about March 20, a larger working force has been put on, carts are bringing in a plentiful supply of timber, and a number of new houses have been added to accommodate a better class of miners. A competent English mining captain and his assistant, with one Englishman in charge of the mills, comprise all the foreign force, and except for the increase of the number of miners and the new houses, no one would be aware that the quiet but pushing work had passed out of private hands into those of a large company.

I was asked by a Brazilian, "When is the company coming out? When will the commissioner and his staff arrive, and the machines—the families?" I replied to him, I was told that work would go on as usual, and the usual extravagancies would not be indulged in; that good Brazilian labour would be encouraged, and big mines would be proved before costly machinery would be put up. "Well," he said, "it will be better for the company, but not so good for us." By "us" he means men like himself, who do not work, but who look out for pickings here and there—some of the waste of these large companies. The Repucha or Borges Mine (same company) have all the machinery that they will need for years to come; and now the work of opening the lode is fairly commenced. Near the surface are several very rich deposits, but these are not to be depended on; they

help when opened, but the pyritic ore is the kind that stays. An adit has just been connected with the Main and Mina d'Agua shafts, and the mill treats all the ore as it comes out. A couple of months later on the mill can be constantly at work. At the Passagem some new but inexpensive machinery is to be put up for treating pyrites, and some new stamps will be added to the present 12-stamp mill. During the year each month's work, but three, has given a good profit. The company start fair and start well. If they will pursue a system of economy and careful work, I predict a great success. The shareholders will be content to see a careful expenditure of money while the mines are being properly opened, and they will know from the gold produce that it is not simply experimenting by assays or holding out encouragement by false or mistaken reports. These mines were not offered to the public until after three years' careful work had satisfied all parties interested that they were worthy of support, and gave promise of a great future.

St. John del Rey Company's mines, nothing new. It was the talk in Ouro Preto, when I was last there, that the company had negotiated a loan of some 8000l. or 8500l. in that city. If this be true, I shall believe that it is very difficult to raise money in London, as the Rio Bank rate is 10 per cent., and private accommodation 12 to 20 per cent. The weather is settled and is fine; but, after a hard rainy season, the prospect is that all kinds of provisions will be very dear.—*Congonhas de Sabará, May 10.*

MINAS.

#### ROYAL UNIVERSITY OF MINING AND SCIENCE.

SIR,—As you have raised the question whether the Normal School of Science and Royal School of Mines shall be chartered as a university, permit me to suggest the whole matter should be systematically discussed in the columns of the *Mining Journal*, so that the real feeling of those interested should be as far as possible ascertained. In that view I have jotted down a few things for discussion; perhaps someone else will add to the number or take them up—opposing or defending as they think proper.

1.—Is it desirable that a degree, enjoying ordinary academic precedence, should be granted to those whose studies have been limited to natural and physical sciences, modern languages (including English), and English history and literature?

2.—Is there any greater disposition to establish a mining school in Cornwall now than formerly? If so, what would Cornishmen do towards obtaining the establishment of the said school.

3.—Would it be practicable to obtain the co-operation of the governing bodies of such institutions as the Leeds College of Science, the Mason College at Birmingham, the North Wales College, the South Wales College, and others of the same class, to the extent of affiliating their colleges with the proposed Royal University of Mining and Science as far as regards their science courses? That is, would the science students of those colleges be trained with a view to passing for the Royal University Science degree?

4.—Would the South Kensington people be likely to oppose or support the project supposing questions 1 and 3 are decided in the affirmative?

It seems to me that until we have reliable information upon these questions it would be mere waste of time to attempt to concoct any scheme that could form the basis of useful discussion as to the character of charter, if any, that should be prayed for. As the movement has originated in the *Mining Journal* I would suggest that all concerned should consider the above questions, and send you their notions about them, and above all things that they point out any obstacles likely to be met with either in obtaining the co-operation of all affected or in the subsequent working of the scheme. For my own part I am in favour of a science degree from a Science University, and I believe this would prevent much heartburning that would result from interfering with present universities, and would give us all the facility we want for classifying the higher technical education of the country, by which I mean indicating the standard of knowledge reached by each science student.—*Manchester, June 9.*

POINT.

#### ROYAL UNIVERSITY OF MINING AND SCIENCE.

SIR,—Your correspondent, "A. R. S. M.," in last week's *Journal*, very justly regrets the absence of sufficient practical teaching in connection with the Royal School of Mines course; he is by no means the only Associate who has suffered from that defect, and I can assure you that a subsequent visit to Freiberg or Clausthal is but a poor remedy. It is not that you cannot get sound practical experience at those schools—as to Clausthal I speak from actual knowledge—but when a young man comes back from a year's course at Clausthal he has still to learn the differences of English practice. As to the hope of establishing a Mining School in Cornwall, I fear it is very small; Cornishmen are too much like Irishmen—they are better workmen out of their country than in it. Ignorance and conceit are the characteristics of Cornishmen at home, and they are too prone to regard everything that is not Cornish as wrong. Some correspondent once wrote in the *Mining Journal* that a Cornishman's head was as hard as the granite he wrought in, and though this may be a slight exaggeration, it is correct, so far that very little impression can be made upon his brain without an interminable lot of hammering.

But suppose a Mining School were established in Cornwall what would be the use of it?—none but Cornishmen could use it. We have been told that outsiders—foreigners as they are called by the natives—are not allowed in the county, except to supply capital for working doubtful mines. Why even Punch said that the Cornish miner's salute to a visitor was—"Heave a brick at him;" and if the visitor is to be battered with bricks in the light of day, what would be the doom of the student when they had got him underground—is he to work with a revolver in his belt, or is he to be armoured-plated? If we are to have a Mining School in Cornwall how can miners of the Camborne fighting type—such as those who attacked the Irishmen—be avoided? It would be very objectionable to be compelled to require all the professors and students to undergo a course of training in prize-fighting, and show their efficiency in the noble art of self-defence before permitting them to enter the school. If "foreigners" undertake to provide the requisite funds for establishing and endowing the Mining School of Cornwall—the Cornishmen long since refused Sir Charles Lemon's 10,000l. rather than consent to learn anything about science—what guarantee will Cornishmen offer that "One and All" will not occupy all their time in preventing the students acquiring the working experience desired.—*Sheffield, June 9.*

B.

#### UNITED STATES OF COLOMBIA—STATE OF TOLIMA, No. II.

SIR,—The town of Natagaima is 30 miles north of Alpe; between the two places nothing of metallurgical interest is to be seen, although the "piedra pintada," or painted stone, is so to archaeologists, being one of the few remaining evidences of a bygone race. It is a fine-grained porphyry with hieroglyphics deeply cut into it, and coloured with a red pigment. It has fortunately resisted alike the action of the weather and the destructive hand of the treasure hunters, who have done so much to destroy the history of the past. The hieroglyphics are said to commemorate the great animal fair held there before the conquest, to which the Chibcha Indians came bringing mantles, golden idols, and jewellery, besides salt from the Cipacquirá Mines, and exchanging these for gold dust.

Near Natagaima are some quartz lodes with strings of silver-lead, but very little has been done towards their exploration. On leaving this town the mountains trend to the north-west, so that the space between the River Magdalena and the hills becomes greatly increased, until on arriving at the River Saldaña the plains must be 100 miles wide. The auriferous gravel keeps on the foothills until arriving at the head waters of the Saldaña it spreads over the plains, forming immense deposits, but not very thick. One or two American (North) Companies have tried to work in a few places, but without any great degree of success, owing more to the want of system adopted than to their mineral wealth being deficient. The Saldaña river is probably, next to the Cauca river, the largest affluent of the Magdalena, draining as it does 504 square miles, and receiving in its course of 160 miles, no less than 229 streams. It is navigable for half the distance in canoes, and steamers of light draught can come

to its mouth at any time of the year, so that doubtless their deposits will not long remain without English capital to develop their wealth. Near a place called Guanabano from 5 cents to 10 cents of gold to the pan can be obtained, and the natives when washing for gold in the Saldaña often find large pieces of native silver, showing that there are some rich silver mines in the hills, although all traditions of them have been lost, they were probably known and worked by the Spaniards, as very often hunters and explorers who traverse these mountain ranges in search of the cinchona or Peruvian bark of commerce stumble upon signs of old workings in the most unexpected places. Copper, with limestone and coal, is found in numerous places, but the cost of transport renders any attempt to work them prohibitive. For miles in the small rivers and streams can be seen the stone walls which were raised on either side, with the small stones thrown behind as a backing, showing where the old men have been at work streaming; but with their rude appliances they were easily stopped, not attempting to work where they had much water to contend with. They constructed ditches with great ingenuity, bringing the water from long distances, and with such good gradients as might shame even modern surveyors. The water was often employed for costeaning as well as for working the higher beds of gravel. In the former case the ditch was carried along the ridge as much as possible, so as to be able then to turn the water down on either side, and, washing away the vegetable soil, lay bare the rock. In the latter the water was brought to the highest part of the mine, falling into a sluice, the gravel being worked in benches and thrown into the stream, which carried away the sand and quicksilver not being used, and the lighter particles of gold. In the sluice men stood with a peculiar instrument, called a recaton, being a curved piece of iron about 1 ft. long and 4 in. wide at the base, where it was fastened on to a handle, and tapering away to a point at its other extremity. With this they kept continually raking up the bottom of the sluice, which was carried on the bed rock, thus allowing the gold to settle by reason of its superior gravity, all the boulders being rolled on either side and piled up, thus forming the walls of the sluice, which often had its course diverted by stones which were too big to be moved, or to suit the face of the bank they were working, whilst other men collected the smaller stones by means of scrapers or cacos, and made from a piece of curved wood about 15 in. long and 6 in. wide, ¾ in. thick, and rounded off at the ends, with a concavity of an inch in the centre; one of these held in each hand enabled them to collect the pebbles, leaving only the very small heavy stones and sand at the bottom of the sluice, and then throwing all the small stuff behind the walls made a backing of great firmness when they cleaned up, which was a lengthy process, as may be imagined; they gradually raked and scraped away the contents of the sluice until little more than the black sand (titanic iron), the heaviest of the gravel, and the gold was left; this was all collected and carefully washed in pans until only the clean gold was to be seen. Of course this necessitated a great amount of labour, but whilst slavery existed this was easily obtained, as after the conquest as many as 15,000 Indians were allotted to a single Spaniard; but now-a-days, although free labour is plentiful, still it costs from 2s. to 3s. a day, so that the gravel must be very rich to pay for working by this method. Another disadvantage was that they soon ran out of grade, and could only work the top gravel. In Malpaso the ancient and the modern system of hydraulic can be seen side by side, very much to the prejudice of the former. Although the old men did a vast amount of work, they never got down through the false bed-rock to the blue gravel, which is now giving fair profits; and if they only had more water would soon become a dividend-paying mine.—*Paignton, June 11.*

H. J. C. WILLIAMS.

#### HOW SOME MINING COMPANIES ARE CONDUCTED.

SIR,—Nearly two years ago I was induced to buy a few shares in the Goginan Lead Mine, through seeing glowing reports about this mine in a circular of a firm of advertising brokers, and as the price of lead has fallen very much since buying the shares the company have been obliged to issue preference shares, and I applied for two shares, conditionally that the whole should be taken up by the shareholders. In applying for the two shares I remitted 6s., the amount of deposit, and early in this year the company requested me to pay the balance, which I declined to do as the shares have not been all taken up; accordingly I wrote the secretary to refund me the 6s. deposited, but he has not done so. Last letter he sent me he said my letters would be put before the directors, but surely there are few meetings, as I asked him per post card if there had been a meeting yet, but he has not deigned a reply.

Of course, such conduct as this will only have the effect of making investors have nothing to do with mining in any form, and especially Welsh lead mining.—*Glasgow, June 11.*

R. P.

#### AURIFEROUS PORPHYRY.

SIR,—On page 669 of last week's *Journal* is a communication from Mr. E. F. Dole, dated May 17, from Milk-street, B.; in which he writes of an inexhaustible quantity of decomposed porphyry, assaying in gold, from \$20 to \$2000 per ton, with which nobody, as yet, has been successful as to its extraction. He says that it is almost flour gold, and there seems to be some oily substance that prevents mercury from taking hold of it. Mr. Dole asks you whether there is any process that will work this, and if you will give the address of any party to whom he can send samples? You may inform him, if you please, that if he sends me a hundredweight sample or more of it prepaid to London, I will, *con amore*, see what I can do with it by my amalgamating process. I may add that I am open to receive for trial by amalgamation, on similar terms, any samples of such refractory gold ores that may be sent me. T. A. READWIN, F.G.S.

London, June 12.

#### OWEN VEAN AND TREGURTHA DOWNS.

SIR,—As a native of the locality of the mines noticed by your correspondent "Tinner," in the *Mining Journal* of May 31, allow me also to make a few remarks. Owen Vean was worked twice entirely for copper, of which a very large deposit was found. A singular incident occurred here. While the mine was idle before the last working a person of the name of Powning accidentally fell into one of the shafts and was drowned; the mine was then full of water, and every expedient short of draining it was unsuccessfully adopted for the purpose of bringing the body to the surface. Thirteen years afterwards, when the mine was pumped dry by the second company, the body was discovered in an upright position behind some bed plank in the shaft, and upon being touched it fell to pieces. A silver watch found upon the remains is still in the possession of a relative of the deceased in Goldsmithy village.

But to return to the mine. The principal shoots of ore, whether copper or tin, are found in these lodes near to their intersection by cross-courses, which are both frequent and powerful here. The great deposit of grey copper ore which sold at 30l. per ton was found in the Owen Vean or central lode, close to one of these cross-courses, and I hear they have two such intersections now in their workings in Tregurtha Downs. Between Owen Vean Mine and the Tregurtha workings there is a long piece of unexplored ground, which is considered to have excellent prospects. Westward from Tregurtha Downs is East Rodney Mine, which now belongs to the Owen Vean and Tregurtha Company, and here again the same lodes being crossed by the Prosper United counter lode. East Rodney was very rich in tin and copper. Still further westward is Wheel Rodney, where from a field of a few acres only the Cornish family received considerably over 20,000l. in royalties from copper ores sold, and here again a large cross-course in all probability accounts for the rich shoots of mineral. Westward still further Wheel Rodney and Wheel Crab on the same lodes were exceedingly productive at shallow depths, and these were also subject to the same cross-course influence. There appears no doubt that the working of the Tregurtha Downs section of the lodes will prove a grand success; at least, that is the unanimous opinion of miners in this locality, and a general hope is felt that it will lead to the reworking of the other settlements westward, of the value of which there are not two opinions. Mining here has never been prosecuted beyond the depth of about 100 fms.



but it is reasonable to expect that deep mining will be as profitable here as in districts where profits are unknown till the workings are carried far below this point.  
GODOLPHIN.  
Marazion, June 10.

#### POLBERRO, AND "FAIR PLAY."

SIR.—Your correspondent "Fair Play," with the wisdom of Solomon and Solon rolled into one, tells your readers that "nothing can be done to make Polberro a good and paying mine but by laying out 20,000l." Not one penny less will do. But even that amount laid out will not create ore in the mine if not already there. West Kitty has cost 3600l., and paid to vendors 3000l. = 6600l. West Kitty has paid in dividends, including a 10s. dividend now due, 17,700l.; clear net profit in three years, 11,100l. How wise "Fair Play" would have looked had he four years ago delivered such an oracle as to this mine as he has now done respecting Polberro. The fact is that the "No credit" mines in the Polberro office are so satisfactorily managed, and the shareholders are so regularly informed of their position as regards the mines that envy and detraction have been induced. If, like West Kitty, the obnoxious Polberro can be opened up for 10,000l., why spend 20,000l., or if for 5000l. why spend 10,000l.? Polberro sold in May about 1 ton of black tin for 50l., not a bad price under the blessings of Free Trade—for foreigners. On June 3 the mine sold 2½ tons of tin stuff, so the mine is not wholly barren. I am sorry for the old tributers, who did not earn one penny in three months. They had better go to Wheel Dearth, where, as "Fair Play" tells us, "something good would be discovered one day." "Fair Play" is not, however, so boldly prophetic here as he is about the future of Polberro. Spend 20,000l.; nothing less will do at that mine.

If "Fair Play" would agitate in order to get a duty put upon foreign tin he would really be doing something to save our "stalwart noble Cornish miners" from starvation or exile, in place of trying to depreciate the value of the mines which are on the no credit system. Of course, as I have before remarked, the Cornish tin mines can only be delivered by such a duty on foreign tin, for with 2425 tons of tin sent to London from the Straits and Australia in last month alone, what hope can the poor fellows, the victims of Bright and Cobden's madness, have for the future?

Trevaunance seems to have sold 11 tons of copper ore at 11l. per ton, a price quite marvellous when the abject and melancholy desolation wrought by Bright and Cobden upon Cornish copper mining is taken into account. I do not hold a single share in any mine, and so, perhaps, I am able to see things as they are, and not as shareholders would wish to see them.  
RECIPROCITY.  
June 9.

#### MINING IN ST. AGNES DISTRICT.

SIR.—As a shareholder in several of the mines which form the West Kitty group I read with considerable interest the letter of "Fair Play" in last week's *Mining Journal*. It must be acknowledged the writer makes plain to everyone his views on mining in general, and of these mines in particular; whether investors or shareholders agree with him is, however, another matter, but passing by differences of opinion I feel sure your readers will welcome with pleasure further contributions from the same pen. "Fair Play" holds that the Messrs. Taylors of London by adopting a wrong system of mining made too much profit out of Polberro, and that the present company appear to be following in their footsteps, inasmuch as they do not at once proceed to lay out 20,000l. on the mine; why this should be the minimum sum is not stated. "Fair Play" states the grounds for his opinions in a straightforward and honest manner—that we want our mines worked for the benefit of our mining population, for the benefit of those out of employ in this district now Penhalls is stopped.

This may be fair play from a Cornish point of view, but investors in mines, who supply the capital may not unreasonably demur to the employing of labour, unless with a view to its profitable employment. West Kitty (which "Fair Play" has curiously overlooked) only called up 12s. per share or 3600l. altogether. Trevaunance with 6s. per share paid appears to be self-supporting, and Wheel Coates is fast approaching (if it has not arrived at) this enviable position, but to the Cornish mind this state of things is altogether unsatisfactory. The rich St. Agnes district is being milked by the wrong hands, and the proceeds are flowing in the wrong direction. It is, therefore, high time "Cornish people should clear the atmosphere, and look into the subject, and into the register, share, and other books sometimes." Methinks Cornish people might also profitably employ their spare time in looking into the debit and credit ledger of a few of the Cornish Mines, and clear up the atmosphere in this direction. But if this proves too much for them, then let them give up the "dog in the manger," policy and give place to others who can prove their ability to raise the necessary capital to work the mines successfully and efficiently at a maximum of profit with a minimum of cost, which modern and enlightened policy "Fair Play" and those who think with him would do well to imitate if they would not at a very early period care to find themselves in solitude contemplating the ruins of Cornish mining.  
J. R.  
Blairgowrie, June 11.

#### THE EAST WHEAL ROSE DISTRICT.

SIR.—As Mr. Charles Bowden seems well acquainted with East Wheal Rose, Old Shepherds, and Tresavean will he kindly state:—1. What number of tons of ore have been sold from East Wheal Rose by the present company, and at what price?—2. How many men are employed in this mine, and what about?—3. When will the mine be drained and placed in proper working order?—4. After the mine is in good working order what does he estimate will be about the number of tons of lead ore raised monthly, the cost of getting it, the amount it will make, and when the mine will be in a position to pay a dividend?—5. Can all this be accomplished without an appeal to the public for additional funds?

Mr. Bowden seems to know all about the above three mines, and therefore should experience little or no difficulty in giving the answers to the above questions. They apply to all three. There is a paragraph in last week's *Mining Journal* that says the lode in the 150 in East Wheal Rose is worth 10 tons of lead ore per fathom, and that the known riches will shortly be in the grasp of the present company. Who is it that knows the lode in the 150 is worth 10 tons of ore per fathom (and when is shortly)? Would it not be preferable to allow the three mines named tell their own story upon their own merits.—Plymouth, June 11.  
H. H. HESTER.

#### SIMULTANEOUS BLASTING WITHOUT ELECTRICITY.

SIR.—We hope you will allow us briefly to furnish the information sought for by your correspondent "C," relative to our patent igniters and instantaneous fuses for simultaneous blasting. We will take his enquiries *seriatim*:—1. We can supply igniters for firing as many as 25 charges simultaneously, but the usual sizes ordered are for from five to eight charges.—2. We usually supply the igniters firmly attached to the fuses, and we recommend their being so issued; but should they become detached an ordinarily intelligent miner could readily fasten them again for use, provided only the fuses have been kept clean and dry.—3. The fumes given off by the instantaneous fuse are less than those from the ordinary safety fuse.—4. The igniters and their fuses, like all similar goods, require to be kept dry, but are not specially sensitive to climatic changes.

We do not comment upon your correspondent's reference to electric fuses and their results. The best test of the value of the respective appliances for ordinary work is their acceptance with the practical public. We are happy to say our new invention is being largely adopted in lieu of electricity in an increasing number of mines and other works.  
BICKFORD SMITH AND CO.

MASONIC UNION OF SOUTH AUSTRALIA.—This week's mail brings us several copies of Bro. J. B. Austin's Rough Ashlar, with the request of correspondents sending them that we will notice that the Grand Lodge of Free and Accepted Masons of South Australia has been inaugurated, and his Honour the Chief Justice of the Colony, Bro. Way, installed the first M.W.G.M., the officers elected to act with him, being, it is believed, fully competent for the duties they have undertaken. That the *sovereign* of the lodges of the

province from the mother grand lodges at home was deferred as long as possible is but natural, though happily Freemasonry is of too pure a nature to permit the declaration of independence by a province to lessen the masonic feeling between the brethren, whether hailing under the new constitution or from the mother grand lodges. Miners are naturally migratory, and many of them can testify the immense benefit they have derived from ensuring a brotherly reception in every country, and whilst masonic feeling is maintained, the elevation of district grand lodges to the rank of grand lodges with responsible government, especially when as in Australia the result has been to unite all masons, whether previously under the English, Scotch, or Irish constitutions, cannot be productive of evil. The numerous readers of the *Mining Journal* who have brethren at the mines in Australia will, therefore, willingly repeat the inaugural prayer of the Very Worshipful the Grand Chaplain to the Grand Architect of the Universe, the Giver of all good gifts and graces:—"We most humbly beseech Thee to bless us in all our undertakings, that we may know and serve Thee aright, and that all our actions may tend to Thy glory, and to our advancement in knowledge and virtue. And we beseech Thee, O Lord God, to bless our present assembling, and to illuminate our minds through Thy great mercy, that we may walk in the light of Thy countenance, and when the trials of our probationary state are over, be admitted into the Temple 'not made with hands, eternal in the Heavens.' So mote it be."

CHAIN AND ANCHOR MAKING EXTRAORDINARY.—Work of an unusual character in the manufacture of chains and anchors has lately been dispatched from the establishment of Messrs. JOSEPH WRIGHT and Co., engineers, Tipton, Staffordshire. These manufacturers are busy upon orders for A 1 special best best J. W. and Co. mining and crane chains, and also upon their No. 2 qualities. A sample of one of the firm's 1½ in. A 1 chain for the London Docks has just proved equal to an extraordinary test. It was tested to destruction at Lloyd's Proving House, and showed a tensile breaking strain of 67½ tons, which is equal to about 200 per cent. over Admiralty proof. The bars from which this unique result was obtained are made specially for the firm for this brand of chain, which doubtless accounts for its splendid behaviour under test. Chains of such quality as these are found especially valuable for lashing and slinging purposes, and should prove of great use to engineers and mineowners. In their anchor department Messrs. Wright are at the present time making Martin's patent anchors, which will be used in the forthcoming Arctic Expedition to be dispatched by the United States Government; and their other contracts include one for 10 Martin's anchors for the Brazilian Government, and one for six anchors for torpedo boats. Work is frequently executed for our own Government by Messrs. Wright.

#### FOREIGN MINING AND METALLURGY.

The condition of the French Iron Trade is still anomalous. Ironmasters in the Nord are endeavouring to maintain prices with firmness at 6l. 8s. per ton, delivered free at Paris, while Paris iron merchants are selling currently at 6l. per ton. This extraordinary state of affairs can only be explained upon the supposition that the iron which is being offered at Paris at 6l. per ton is obtained from forges in the more immediate neighbourhood of that capital. On the other hand, this latter group of forges is only working about half time. There is no change of interest or importance to report in connection with the German iron trade. Pig has been in less demand than it was a month since, and the same may be said of ordinary iron; on the other hand, there has been a rather marked demand for plates and iron wire. Upon the whole the situation must be characterised as rather unfavourable. The exports of pig from Germany in the first quarter of this year amounted to 55,163 tons. The exports of rails in the same period were 30,229 tons; those of plates, 10,249 tons, and those of iron wire, 45,001 tons. Quotations have not changed during the last few days. Some adjudications are announced which are likely to afford employment to the steelworks and mechanical construction establishments. The house of Herschel, of Cassel, has obtained an order for locomotives at Berlin.

The improvement anxiously looked for in the Belgian iron trade has not yet appeared. Belgian ironmasters are vegetating on somehow, and that is the utmost which can be said. They consider themselves fortunate if they have orders on hand for a fortnight in advance, so that the general condition of affairs must be regarded as far from brilliant. An adjudication has just taken place for 500 tons of wheels for the Upper Italy Railway; the tenders sent in by German firms were 16 per cent. lower than the offers made by Belgian competitors. Prices have not experienced any important change upon the Belgian markets. English casting pig has, however, been rather less well maintained at 2l. 3s. per head, and in the case of considerable transactions still lower rates might possibly be obtained. As regards refining pig, hard pig has made 2l. 0s. 10d. per ton; ordinary pig, 1l. 16s. 8d. per ton; and mixed pig, 1l. 12s. 10d. per ton. Iron has shown some weakness upon the Belgian markets. Attempts are made to maintain a quotation of 4l. 12s. per ton, but transactions might, probably, be carried through at 4l. 10s. per ton, although this latter price is far from being generally current. The average price for No. 1 may still be taken at 4l. 12s. per ton, which is equivalent to 4l. 18s. per ton for No. 2, and 5l. 4s. per ton for No. 3.

The intelligence received as to the Belgian Coal Trade does not present much interest for the moment. Prices have scarcely varied, and as the summer has come nearer and nearer the demand has gradually fallen off. Stocks have not increased to any great extent taking the bad condition of metallurgical industry into account, but attempts are being made to reduce the extraction, and to diminish as much as possible the quantities of coal which are likely to be carried into stock during the summer months. Deliveries of coal are still being made upon a relatively considerable scale, and this fact has, of course, a tendency to sustain the markets. In the Coudant de Mons the general condition of affairs is regarded as favourable, and prices have been supported with firmness. Coal for metallurgical purposes has been somewhat neglected, but a demand on the part of the sugarworks has commenced in the Hainaut. The number of trucks carrying coal and coke which passed over the Belgian State Railways in the week ending June 1 was 16,694, as compared with 15,344 in the corresponding week of 1883, showing an increase of 1350 this year. The situation has not varied materially in the German coal trade, business being fairly well maintained. Contracts have just been let at Berlin and Breslau for 580,500 tons of coal; the contract prices were 3d. to 5d. per ton lower than last year.

A RICH IRON DEPOSIT.—In a New South Wales gully or creek, called the Waterfall Creek, running into the Cadiangallong Creek, and at the extremity of a mountain spur known as the Rocky Ridge, there is an immense mass of oxydulous iron (hematite) forming in one solid mass a precipitous waterfall of about 60 ft. in height. In this mass of iron, especially in the joints, there are brilliant crystals of iron pyrites, with a small quantity of yellow copper ore and traces of blue and green carbonate of copper. Here also is found iron sulphate, from the decomposition of the pyrites.

PROGRESS OF COLONIAL ART TASTE.—In New South Wales the colonists have not allowed the business of money-making to wholly engross their attention, for, in addition to a large and well-arranged museum, they possess the nucleus of a splendid art collection, in which several leading English painters are represented by some of their best works. The gallery in which this collection is placed is largely frequented, and will before long be replaced by a structure worthy not only of the colony, but also of the art treasures which it is destined to contain. There is likewise in Sydney an Art Society numbering over 200 members, which has an annual exhibition of works produced by the members, and which has just held a black and white exhibition of a most creditable description. In connection with the Board of Technical Education free lectures on ornamental art are delivered weekly to large and appreciative audiences, and everywhere are to be found indications of the rapid growth of a popular taste for art.

#### ON PORTABLE RAILWAYS.—No. III.

BY PAUL DECAUVILLE,\* OF PETIT-BOURG (SEINE AND OISE), FRANCE.

Owing to the great lightness of the portable railways and the facility with which they can be worked the attention of explorers has repeatedly been attracted by them. The expedition of the Ogowé in October, 1880, that of the Upper Congo in November, 1881, and the Congo Mission, under Savorgnan de Brazza, have all made use of the Decauville narrow-gauge railway system. During these expeditions to Central Africa one of the greatest obstacles to be surmounted was the transport of boats where the rivers ceased to be navigable, for it was then necessary to employ a great number of negroes for carrying both the boats and the luggage. The explorers were more or less left to the mercy of the natives, and but very slow progress could be made.

On returning from one of these expeditions in Africa Dr. Balay and Mr. Mizon consulted the author as to whether the narrow-gauge line might not be profitably adapted for the next expedition. He accordingly proposed to transport their boats, without either taking them to pieces or unloading them, by placing them on two pivot trolleys, in the same manner as guns are transported in fortifications and in the field. The first experiments were made at Petit-Bourg with a pleasure yacht. The hull, weighing 4 tons, was placed on two gun-trolleys, and was moved about easily across country by means of a portable line of 20 in. gauge with 14 lbs. rails. The length of the hull was about 45 ft., depth 6 ft. 7 in., and breadth of beam 8 ft. 2 in.—that is to say, five times the width of the narrow-gauge, notwithstanding which the wheels never left the rails. The sections of line were taken up and replaced as the boat advanced, and a speed of 1100 yards per hour was attained. Dr. Balay and Mr. Mizon declared that this result far exceeded their hopes, because during their last voyage the passage of the rapids had sometimes required a whole week for 1100 yards (1 kilometre), and they had considered themselves very lucky indeed if they could attain a speed of 1 kilometre per day. The same narrow-gauge system has since been three times adopted by African explorers, on which occasion it was found that the 20 in. line with 9 lbs. or 14 lbs. rails was the most suitable for scientific expeditions of this nature.

The trucks used are of the kind usually employed for military purposes, with wheels, axles, and pivot bearings of steel; on being dismounted the bodies of the two trucks form a chest, which is bolted together, and contains the wheels, axles, and other accessories. The total weight of the 135 yards of roads used by Dr. Balay and Mr. Mizon during their first voyage was 2900 lbs., and the wagons weighed 5000 lbs. Hence the expedition had to carry a supplementary weight of 3½ tons, but at any moment the material forming this burden became the means of transporting in its turn seven boats, representing a total weight of 20 tons.

It is impossible to enumerate in this paper all the various kinds of wagons and trucks suitable for the service of ironworks, shipyards, mines, quarries, forests, and many other kinds of works; and the author has, therefore, limited himself to mentioning only a few instances which suffice to show that the narrow-gauge can be applied to works of the most varied nature and under the most adverse circumstances possible. It remains only to mention the various accessories which have been invented for the purpose of completing the system. The off-railer is used for establishing a portable line at any point diverging to the right or left of a permanent line, and for transferring traffic to it without interruption. It consists of a miniature inclined plane of the same height at one end as the rail, tapering off regularly by degrees towards the other end. It is only necessary to place the off-railer, which like all the lengths of rail of this system forms but one piece with its sleepers and fish-plates, on the fixed line, adding a curve in the direction in which it is intended to go, and push the wagons on to the off-railer, when they will gradually leave the fixed line, and pass on the new track. The switches consist of a rail end 49 in. long, which serves as a movable tongue, placed in front of a complete crossing, the rails of which have a radius of 4, 6, or 8 metres; a push with the foot suffices to alter the switch. There are four different models of crossings constructed for each radius—1. For two curves with symmetrical divergence.—2. For a curve to the right and a straight track.—3. For a curve to the left and a straight track.—4. For a meeting of three tracks.

When a fixed line is used it is better to replace the movable switch by a fixed cast-iron switch, and to let the men who push the wagon turn it in the direction required. Planed switch-tongues are also used, having the shape of those employed on the normal tracks, especially for the passage of small engines; in this case the switches are completed by the application of a hand-lever. The portable turntable consists of two faced plates laid one over the other—the lower of thick sheet-iron and the upper of cast-iron. The sheet-iron plate is fitted with a pivot, round which the cast-iron plate turns; there plates may either be smooth or grooved for the wheels. The former are used chiefly when it is required to turn wagons or trucks of light burden, or in the case of earthworks for trucks of moderate weight. These turntables are quite portable; their weight for the 16 in. gauge does not exceed 200 lbs. For engineering works a turntable plate with variable width of track has been designed, admitting of different tracks being used over the same turntable.

For permanent lines and to carry heavy loads turntables with a cast-iron box are required, constructed on the principle of ordinary railway turntables. The heaviest wagons may be placed on these box turntables, without any portion suffering damage or disturbing the level of the ground. In the case of coal mines, paper-mills, cow houses, &c., with permanent lines fixed plates are employed. Such plates need only be applied where the line is always wet, or in workshops where the use of turntables is not of frequent occurrence. The fixed plate is most useful in farmers' stables, as it does not present any projection which might hurt the feet of the cattle, and it is easy to clean.

The only accident that can happen to the track is the breaking of a fish-plate. It often happens that the fish-plates get twisted, owing to rough handling on the part of the men, and break in the act of being straightened. In order in such cases to facilitate the repairs as much as possible the fish-plates are not riveted by machine, but by hand, and it is only necessary to cut the rivets with which the fish-plate is fastened, and remove it if broken. A drill passed through the two holes of the rail removes all burrs that may be in the way of the new rivet. No voices are required for this operation; the track to be repaired is held by two men at a height of about 28 in. from the ground, care being taken to let the end under repair rest on a portable anvil, which is furnished with the necessary appliances. The two fish-plates are put in their place at the same time, and the second rivet is held in place with one finger while the first is being riveted with the hammer; if not so held in its place it may be impossible to put the second rivet in afterwards, as the blows of the hammer often cause the fish-plate to shift, and the holes in the rail are pierced with great accuracy, to prevent there being too much clearance. No other accidents need be feared with this line; and the breakage above described can easily be repaired in a few minutes without requiring any skilled workman.

The narrow-gauge system, which has recently undergone so great a development on the Continent, where its usefulness and the facility of its application to the most varied purposes have been demonstrated, has not yet met in England with the same universal acceptance; and those Members of the Institution who last year visited Belgium were perhaps surprised to see so large a number of portable railways employed for agricultural and building purposes and for contractors' works. But in the hands of so practical a people it may be expected that the portable narrow-gauge railway will soon be applied here to even a larger number of purposes than elsewhere.

\* Paper read at the recent meeting of the Institution of Mechanical Engineers.

HOLLOWAY'S PILLS can be confidently recommended as a domestic remedy for the ailments of all classes and conditions of people. Young and old of both sexes may take this medicine with the certainty of deriving benefit from its use, when disorder or disease is making them miserable. Holloway's pills are unrivalled for their purifying, aperient, and strengthening properties. They remove indigestion, palpitation, and headache, and are specially serviceable in complaints peculiar to females. Each box is wrapped with printed instructions for the guidance of invalids who will readily understand, from carefully studying them, the best way of recovering health. Holloway's pills will work a thorough change in the constitutions of the weak and nervous.



## IMPROVED TYPE OF GUIBAL FAN.

An interesting series of "Notes on an Improved Type of Guibal Fan," was read by Mr. CHARLES COOKSON, of Wigan, at the general meeting of the South Staffordshire and East Worcestershire Institute of Mining Engineers at Dudley, on Monday (Mr. A. Sopwith in the chair). The author said: Before describing my improved Guibal fan I must ask your attention for a few moments while I state the conclusions to which I had arrived after a long series of experiments with regard to the comparative efficiency of the most generally used mine ventilators. Briefly stated, I had assured myself of the following points:—1. That centrifugal ventilators or fans are much preferable to the variable capacity or air-pump type of ventilator.—2. That the Guibal is a much more effective fan than the Waddle and Schiele, because of its ability to produce at a given speed of the tips of the fan-blades a much higher water-gauge, and consequently under similar mine conditions a greater quantity of air than either of the other types of fan.—3. That with regard to economy the Guibal (if properly proportioned for its work) will give out a higher percentage of useful effect than either the Waddle or Schiele.

To these conclusions I had been led by numerous experiments which I had been able to make at the Wigan Coal and Iron Company's collieries on both Schiele, Waddle, and Guibal fans, and feeling so absolutely convinced of the theoretical and practical superiority of the Guibal, I began to consider whether even it could not be improved in any way, particularly in the direction of overcoming the main objection to its use—the great size, weight, and expense of fan required to do heavy work, the advocates of the Schiele fan having here a decided advantage to claim over the Guibal, as even at some collieries it would be practically impossible to put up a Guibal fan on account of the space and depth of excavation required.

With this object in view I designed and patented an improved type of Guibal fan, in the hope that it would be what I had termed it, the "Silent Guibal,"—that is, a fan of the Guibal type, having all its great advantages, and yet, at the same time, being a silent, non-vibratory fan like the Schiele, and thus combining all the good points of each type of fan; and this, I think, I may fairly claim to have accomplished.

At the time of taking out my patent the Wigan Coal and Iron Company were considering the advisability, and, indeed, the possibility, of successfully setting a fan to work to take the place of the underground furnaces at their Dairy Pit; and, on laying my plans before them, they made sure of not making any mistake, by having working models (50 in. in diameter) made of the improved and ordinary Guibal. With these models a number of experiments were made, which fully confirmed my ideas, and proved conclusions that—1. The improved fan was really a silent fan, without any vibration.—2. That, under like conditions, if produced at slightly higher water gauge and a little larger quantity of air than the ordinary Guibal. On the strength of these experiments it was determined to put up one of the new fans; and, instead of having an ordinary Guibal of 45 to 50 ft., as had been thought necessary to do the very heavy work required, an improved Guibal, 30 ft. in diameter, was put up, and, since August last, has been working most satisfactorily.

The Dairy Pit fan is 30 ft. in diameter, has a close fitting casing expanding chimney and adjustable shutter, like the Guibal; but the blades of the fan are made to taper from a width of 15 ft. at the inlet end of the blade to 7 ft. at the tip, this tapering of the blade being so proportioned as to give an equal area of air-passage throughout the fan; and it is in this that the main alteration lies, and it is owing to this that the fan is a silent one. This particular fan draws its air through one inlet 14 ft. in diameter, the fan being connected to the upcast by a circular iron tube of that size. The upper half of the fan casing is made of iron plates, cast to the outline of the curves of the blades, and roofed with wood lags, while the lower half and fan race and chimney are built in brickwork to the same curve. The fan itself is constructed on the usual lines—in fact, it is the framework of a Guibal fan which the company had on their hands.

Such is the fan, and it was put up to produce 5 in. of water gauge, and to be able to pass 500,000 cubic feet of air per minute. In order to get this excessive water gauge, the fan has to run at fully 80 revolutions per minute, and as it was not thought wise to couple up the engines we had direct to the fan it was decided to drive the fan with grooved pulleys and cotton ropes, so proportioned that with the engines at 50 the fan runs at 80 revolutions per minute. The ropes are 15 in. number, each 2 in. in diameter, and are amply strong enough to transmit 365-horse power per minute at 80 revolutions of the driven pulley. The engines are in duplicate, horizontal and condensing, having cylinders 30 in. diameter, and 26 in. stroke.

This plant was erected to take the place of two underground furnaces, having a fire-bar area of 129 square feet, of which 12 tons 17 cwt. of Arley mine mixture were burnt per 24 hours, producing with the furnaces very hard fired, 142,570 cubic feet of air per minute, the sort of wages being 19s. 3d., and for fuel 4l. 3s. 7d., or a total cost of 5l. 2s. 10s. for 24 hours, which, multiplied by 365, will be 1876l. per annum.

When the fan was started, it was found, after careful testing, that it got the same quantity of air as the furnaces when running at 52 revolutions per minute, burning 4 tons 2 cwt. of rough buzzard slack per 24 hours, and costing for wages 10s. 6d., and fuel 15s. 4d., or a total per day of 1l. 5s. 10d., which, multiplied by 365, gives a cost of 471l. per annum, or a saving, by the use of the fan, on the two items of fuel and labour of 1405l. per annum. Of course, from this an allowance ought to be made for interest, depreciation, stores, &c.

In addition to this great saving, we were able to increase the quantity of air in the mine enormously, the fan producing at 80 revolutions per minute (at which speed it works quite easily and practically noiselessly) an increase of 56 per cent. in the quantity of air, namely, from 142,570 with the furnaces to 222,750 with the fan, the latter quantity being produced under a water gauge of 4.7 inches in the fan drift and 4.95 at the fan side next to engines. The useful effect calculated on the lesser water gauge in fan drift being 70.3 per cent. of the steam power in cylinder of 234 horse power. This test was made soon after the fan started, at which time the upcast (230 yards deep) was unbricked and 9 ft. in diameter for half its depth, and 10 ft. in diameter bricked for the remaining half, and in order to lessen the friction of air in the upcast it has since then been enlarged to 14 ft. in diameter, and when this work was about half completed another test was made, and the fan was found to be giving 74 per cent. of useful effect; this result being obtained from an average of 11 diagrams taken at certain intervals during the whole duration of measurements of air which were taken underground, on account of the difficulty of accurately measuring the air close to the fan. The results being as follows:—With the fan at 75 revolutions, air, 230,092; water gauge drifts, 4.070; fan, 4.275; pit top, 4.025; horse power air, 147.178, and horse power engines, 196.4.

This enlargement of upcast is now completed, and with the mines in their present condition we are getting 248,800 ft. per minute at 80, with a water gauge of 4.7 in. drift and 4.95 at fan; the total quantity of air having been decreased by sealing certain splints in which the fan was circulating more air than was required. After this sealing on making a third test we found that with the fan at 70 we were getting 71.97 per cent. of useful effect, so that I think there can be no doubt that the fan is giving nearly 75 per cent. of useful effect. The measurements having been most carefully made by independent persons, and with anemometers and indicators accurately tested and corrected; the useful effect being worked out in the usual manner by multiplying the volume of air by the rate in inches by 5.18, and dividing by 33, we get the horse-power in air current.

In conclusion let me briefly state what advantages I claim for the improved Guibal fan:—1. That fans of this type, of from 12 to 20 ft. in diameter, are able to do at the same blade tip-speed just as much as any Guibal fan of the usual size of (say) from 30 to 50 ft. in diameter.—2. That on account of their less size and weight they are not so liable to break down and injurious straining; and for the same reason are much more economical than the larger Guibal; as, if my fan is properly proportioned for the work it has to do, there is no reason why it should not get from 70 to 75 per cent. of useful effect, as compared with the results of 40 per cent. up to 52.95 per cent.

given in the report of the North of England Fan Committee.—3. They are less costly to erect on account of the less size of the fan and casing, and requisite foundation and excavation, &c., than a Guibal would be to do the same work.—4. They can be made as small and light as the Schiele, and will give equal water gauges and quantities of air at an average of two-thirds of the speed that would be required by a Schiele to do the same work.

## HOW TO RESTORE THE BRITISH IRON TRADE.

That our metal trades are and have for some time been seriously depressed is unfortunately beyond dispute, and although it would now be useless to repine we are constrained to admit that our manufacturers have themselves contributed to some extent to bring about that unsatisfactory state of affairs which they are now deploring. Formerly the name of a British manufacturer upon a piece of metal, in whatever form, was so reliable a guarantee for high quality that it could command a market anywhere; but now, alas, in the rush for low price quality has become so much a secondary consideration with producers that buyers find no special attraction in the English market. But the majority of users still appreciate high quality as much as ever, or we should not find that, even at present, the best brands of British iron always command a ready sale, and at prices which permit of the workmen being well paid, and at the same time leave a good remunerative profit to the manufacturers. So far as regards iron and steel, high quality may be almost accurately measured by the extent of freedom from phosphorus and sulphur, and it is not difficult to conceive that, although an approach to perfection may be attained by skilful chemical and mechanical manipulation of impure ores, an enormous advantage, whether considered with regard to the resulting material, or to the profit of manufacture, must result from the possession of a raw material which does not require purification.

Recognising these facts, the necessary preliminary steps are being taken for acquiring and developing some very attractive properties producing, among other minerals, a non-phosphuretted ferruginous mineral with a view to place upon the market a quality of iron and steel which shall ensure satisfaction whenever used. The property was incidentally alluded to in the *Mining Journal* of May 24, and some further details may now be given concerning it. It is intended to form a company with an influential and practically experienced board of direction to work the Sandwick minerals in South Shetland and the South Exmouth Mine, in South Devon, which yield the character of ores adapted for the attainment of the object in view. The Sandwick property, which is conveniently situated on Sandwick Bay, is well opened, and displays a vast deposit of brown hematite iron ores and spathose iron ore, lying in veins or lodes varying in thickness from 9 ft. to 70 ft., averaging 30 ft., of unknown depth and unlimited range. Not far distant from the mine is a fine deposit of compact micaceous or specular ore, similar to the celebrated ore of Elba, almost a pure peroxide of iron 3 ft. in thickness, which will prove to be a very valuable and important accessory. The mineral rights extend over an area of about 20 square miles, and the whole is held under a lease for 50 years at a rental of 300l. per annum, covered by royalties *pro tanto*, the royalties being 8d. per ton on iron ores and 1s. on copper ores, with rights for land required for building works, houses, and other necessary erections.

The importance of an abundant supply of spathose ore—the Stahlstein or steelstone of the Germans—is well known to all iron and steel manufacturers; it is a carbonate of iron, manganese, lime, and magnesia, containing in the calcined state from 40 per cent. upwards of metallic iron, and some metallic manganese, but is quite free from sulphur and phosphorus. It is the ore from which spiegeleisen and steel are made in Siegen, Prussia, from which the celebrated cannon of Krupp are made, and the fine Austrian steel is made in Styria, the material of the old "Noricus Ensis," so prized by the Romans. Treated for grey or white metal, it yields by due admixture in the puddling or converting furnace the finest and strongest bar iron in Germany. Iron specially suited for armour-plates, axles, gun barrels, coils for cannon, anchors, chains, wire drawing, conversion into steel, &c.; indeed, it is more easy to enumerate the purposes to which it is applicable than those to which it is not. Its grey metal is the staple, its white metal or spiegeleisen is the essential element of the final stage in the Bessemer process. Although varieties of this ore contain as much as 60 per cent. of iron when calcined, it is at the expense of their content in manganese, the most important component part in spiegeleisen; for as limestone has to be added as a flux in the smelting furnace, the ore of Sandwick being naturally provided with lime and magnesia, what is called the burden of the furnace or its charge, will not yield a less percentage of metal than the apparently richer ore, the flux required being by so much less. Above this ore in the order of superposition in the mineral deposit, is a great mass of hydrated brown hematite iron ore or peroxide of iron, the result of the decomposition of the spathose ore by the infiltration of rain water during past ages. This ore, when calcined, yields more than 60 per cent. of iron with some manganese. It contains only an insignificant amount of sulphur, phosphoric acid, and copper. Mixed with the spathose ore in due proportion it yields in Germany the fine grey metal from which alone can be made the beautiful works of art called Berlin castings, so much imported into this country. This superiority is due to the extreme fluidity of the metal, which allows it to take the finest lines of the mould. It will be extensively employed in England in making the numerous articles called malleable iron castings, among which spinning machinery will employ it in great quantities. By the addition of iron ores rich in manganese, or of manganese ores, the company will be able to make spiegeleisen of any degree up to ferro-manganese. The prices of such metals have varied from 4l. 4s. up to 12l. 10s. per ton, according to the degree in manganese. The latter high price was lately obtained for ferro-manganese f.o.b. at Antwerp.

The South Exmouth mineral tract promises to contribute quite as largely to the prosperity of the concern as the Sandwick property, since the lodes are owned for about three quarters of a mile, and are of great breadth. The spathose ore contained is exceptionally rich in metallic manganese; no ore in Europe contains more, not more than one or two so much. The produce in cast-iron from these ores will be either absolutely free from phosphorus, or will contain only an insensible quantity. There are valuable lodes of copper and lead ores in the estates, which will at some time be turned to profitable account, although it is not at present intended to work them; they are distinct, and do not in any way contaminate the iron, which will at present be made the great source of profit. The rapidly extending use of Bessemer and Siemens-Martin steel for a variety of new purposes has led to a corresponding increase in the number of Bessemer and other plants, some altogether new, many more due to the conversion of ironworks into that branch of manufacture. The consequence has been that the demand for Bessemer metal free from phosphorus and for spiegeleisen and ferro-manganese is constantly increasing, while the means of supply, if not actually stationary, have not increased in the same proportion. Attempts, it is true, have been made and are still in operation, to adapt the Bessemer converter to the highly phosphuretted and cheap though poor ores of Cleveland, but it remains to be seen how far these attempts have been economically even if physically successful. It has been hastily assumed by many that the supply from British resources of ores suitable to the production of spiegeleisen and ferro-manganese is so limited as to render necessary importations from abroad. The United States have not hitherto discovered deposits of such ores, though, to a limited extent, the magnetic ore called Franklynite has been available as a substitute.

For the conversion of the raw material into merchantable form every care seems to have been taken to make the requisite provision, a splendid site for ironworks has been secured by the vendor upon 2½ acres of land on the south bank of the Tees, above Middlesborough, which will become the freehold property of the company. To this the iron ores will be brought by sea from Shetland wholly, from South Devon with only about ten miles carriage by rail to Teignmouth, the port of shipment. In both cases there will be a back freight in coals. Upon this site it is proposed by the directors to erect two blast-furnaces of large size, capable of throwing each from 600 tons and upwards of cast-iron per week, and furnished

with powerful blowing machinery, and all appliances necessary for a great trade in iron of a superior quality. Fuel of the finest quality in strength and purity can be delivered at the furnaces at 12s. 6d. per ton of iron, with 1d. royalty only for the use of the adjoining branch of the North Eastern line. The vendor has also entered into a provisional agreement with a company in South Wales to rent two furnaces with all necessary appliances during the time occupied in building the blast-furnaces on the Tees, the company undertaking to supply fuel, coke, and coal at a fair and moderate price. He has also agreed with a proprietor of mines in Spain to supply at a fixed price spathose ores, to be delivered at the nearest port. These ores contain in the calcined state 60 per cent. of iron and some manganese, and, properly treated, will yield either the finest grey metal or spiegeleisen, either of which will find a ready sale. The yield of these furnaces will be little short of 500 tons per week, giving at the moderate estimate of 10s. profit, 250l. per week, or 13,000l. per annum. This, added to the profit on the copper at its lowest estimate of 10,000l., will amount to 25,000l., which would pay a dividend of 15 per cent. on more capital than would be called up. The above arrangements will all be at the disposal of the company, and will enable it to employ its capital with profit while proving, at moderate cost, the ores of iron at its command, with a view to their future treatment on the greater scale of the larger furnaces on Tees. The directors are of opinion that a very much larger profit than 10s. per ton will, on the average of prices for their produce, be obtained, but they adopt the smaller rate in order to avoid the danger or appearance of exaggeration. At the lower scale of 10s. per ton on two furnaces throwing each 600 tons of pig-iron per week, the profit would be 31,200l. per annum, which, added to 15,000l., the profit on the copper mine after the outlay of further capital, makes an aggregate of 46,200l. An exhaustive report upon the property has been made by Sir Francis C. Knowles, Bart., M.A., F.R.S., whose great experience as a practical metallurgist gives considerable authority to his opinion, but a full abstract of it must be deferred until next week.

In this connection it may be stated that although the name only was given, without the rank, it was Sir Francis C. Knowles who in 1867 wrote the celebrated Newcastle Prize Essay on England's Industrial Supremacy in the Manufacture of Iron—an essay so full of information and interest that it is well worthy of republication at the present time.

## MINING IN IRELAND.—THE AVOCA MINES, COUNTY WICKLOW.

It would appear that during the past half-year the expenditure of the Avoca Mineral Company, the scene of whose operations is the County Wicklow, has been reduced by 33½, the sales of ochre having realised 408½. The pumps at Connore Mine are now working, but excessive rains have involved a loss of several tons of precipitate. There are 500 tons of ochre on hand, the value of which is 35s. per ton free on boat at Wicklow. The company are asked to supply 300 tons of bluestone per month for two years. The improvements in Wicklow Harbour now afford additional facilities for the loading of vessels. As the entire concern is in approved working order, the outcome of this enterprise is regarded with much local and general interest.

THE DELIGHTS OF COACHING.—It may safely be asserted that many who are quite unable to pronounce an authoritative opinion upon the dramatic merits of Chrononhotonthologos might incline to exclaim, "O for a coach, ye gods!" and not a few of these, that is to say, the exclaimants, we will say nothing about the gods, will appreciate the admirable little volume, by An Old Whip, bearing the above title. If it be not printed exactly in imitation of the antique, it would pass very well as belonging to the good old coaching times of the beginning of the century. There are chapters on the coachman, the road, the coach (When Queen Elizabeth came to the crown, a coach in England then was scarcely known. Then 'twas as rare to see one as to spy a tradesman that had never told a lie), and the revival of coaching within the last 20 years. Each chapter has a beautifully designed initial by Francis Lathorp, and is moreover embellished with an etching by Mr. S. J. Ferris, which would do credit to a volume of greater pretensions, for the sole object of issuing the present book is to impress upon the reader that Messrs. Murphy and Co., of New York, Cleveland, and St. Louis manufacture the best obtainable coach varnish, and to remind him that technical education—the advantage of which has always been maintained in the *Mining Journal*—has been thoroughly turned to account by these varnish manufacturers, who combine practice with science in having the finished article tested by a skilful carriage painter to supplement the scientific tests in the laboratory.

THE ANTIPODEAN NEWCASTLE.—The export of coal from Newcastle in New South Wales during 1883 amounted to 1,359,505 tons; in 1874 the quantity was 724,204 tons, since which time there has been a steady annual increase, except in 1880, when in consequence of a labour dispute the quantity sank to 673,393 tons.

RAILWAYS FOR WESTERN DAKOTA.—The discovery of tin in the Black Hills of Dakota revives the discussion of the scheme of a railroad to that region. Both the Chicago and North-Western, and the Chicago, Milwaukee, and St. Paul Railroad Companies have lines to the Hills marked as projected on their maps, but neither of these strong corporations seems disposed to build west of the Missouri river. Several years ago the Northern Pacific asked Congress for the right of way across the public lands from some point on its line west of Mandan to the Hills, but so unreasoning was the hostility to railroads in that body at the time that this very reasonable request was refused. The best route is probably that laid down by the Northern Pacific Company, because it is the shortest from any existing railroad, and traverses a country where construction would not be expensive. It may well be doubted, however, whether the Black Hills can support a railroad, unless there should be a new and considerable development of mining industry in that isolated region. Its present population and business are not sufficient to attract prudent railway managers.

TELEGRAPHIC PROGRESS IN NEW SOUTH WALES.—The development of telegraphic business in New South Wales has been something wonderful, as shown by the fact that in 1873 there were 652 miles of wire, 105 telegraphic stations, and 365,360 messages sent, whereas in 1882 the mileage had increased to 15,901, the stations to 345, and the number of messages sent to 1,965,931.

MANUFACTURING PROGRESS IN AUSTRALIA.—In the New South Wales Statistical Register are to be found many interesting details illustrative of manufacturing progress in that colony, especially in the production of agricultural machinery, and brass, lead, and iron goods; but perhaps the most characteristic feature which strikes a reader is the rapid expansion of the sugar industry. The number of mills for producing sugar and molasses rose in the 10 years from 30 to 70, and the quantity of sugar and molasses increased from 14,400 cwt. and 42,235 gallons to 210,568 cwt. and 623,247 gallons respectively, while the quantity of refined sugar manufactured in the colony rose from 180,369 cwt. in 1873 to 508,500 cwt. in 1882.

CEUR D'ALENE CARBONATES.—The latest excitement in the new gold fields of Ceur d'Alene, Idaho, is over quartz discoveries along Eagle Creek. A boy recently struck a lead about ten miles up the gulch, and specimens of the rock were taken into camp. Several old miners were wild with delight, and declare that carbonates had been found equal to those of Leadville. Crowds were busy inspecting the specimens daily. There are both hard carbonates and sand carbonates, and sulphates are clearly seen. The rock carries no free gold, but is pronounced rich by all experts who have seen it. Several parties are preparing to thoroughly prospect the locality, and the boy who stumbled on the lead is already considered well-to-do. The vein is 18 in. wide, but it has been gone into but 2 ft., owing to the condition of the blasting powder used. The first sale of a quartz lead is just reported, it being that of the Old Abe Mine, about three miles from Eagle City, on the north bank of the Pritchard Creek. Spokane Falls capitalists are the purchasers, but the amount is not given out, though the money has been paid and the original locators are delighted. The vein is from 6 to 10 ft. in width, and assays show as high as \$20 to the ton. The recent strikes have encouraged the camp to hope for big money in quartz, and many prospectors are getting into the side gulches.



Hadfield's Sheet of Drawings.

List No. 28b.

# HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD.

GOLD MEDAL.



Gold Medal, Paris, 1878.

Gold Medal, Madrid, 1883.



Contractors to H. M. Home, India, and Colonial Governments; Home, Foreign, and Colonial Railways, Admiralty, War Departments, &c.

GOLD MEDAL.



Gold Medal, Melbourne, 1881.

Special Diploma of Honour and Silver Medal, Sydney, 1880.

HIGHEST AWARDS, LEEDS, MANCHESTER, WREXHAM, CORNWALL, &amp;c.

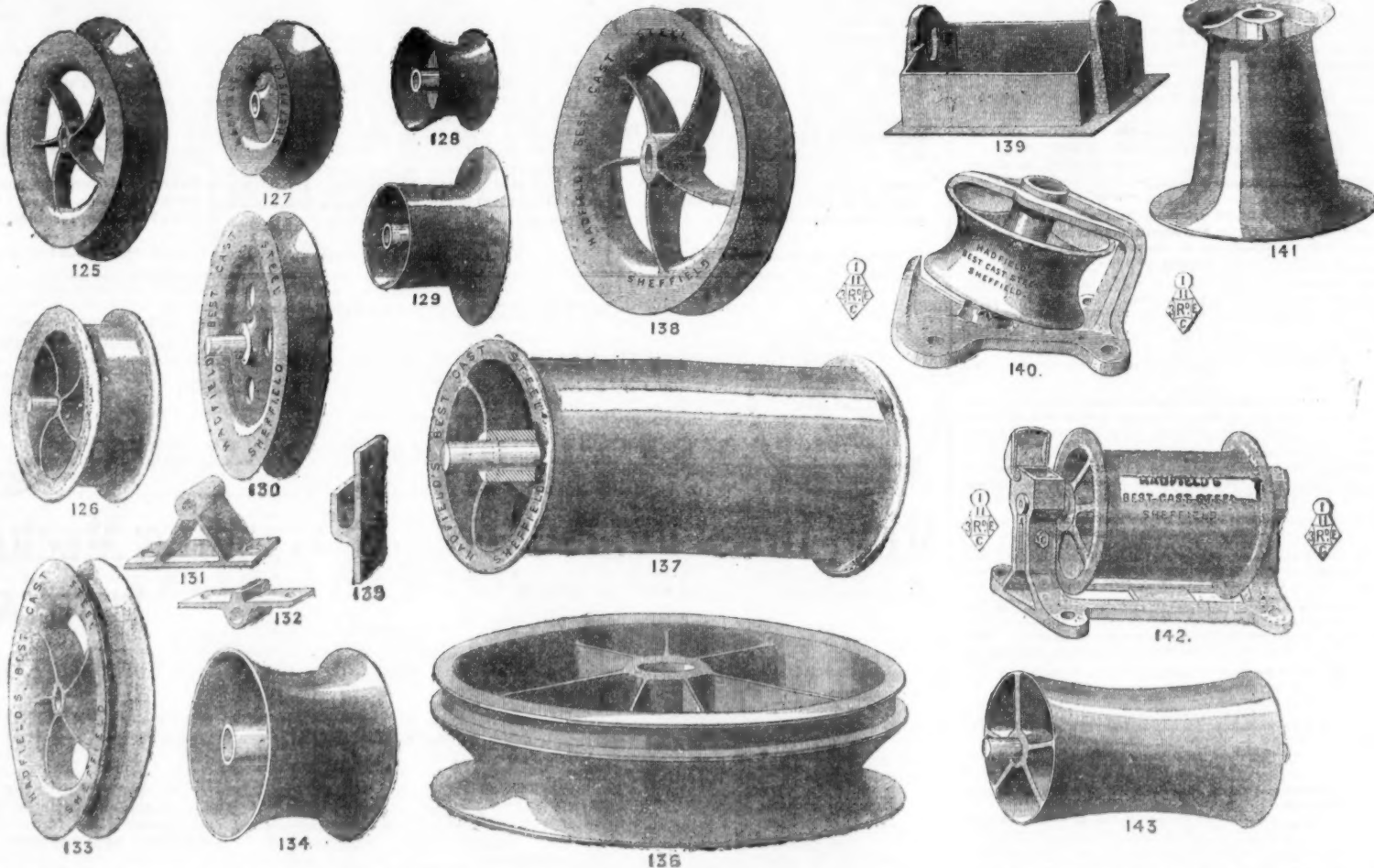
## ▷ HADFIELD'S CAST STEEL WHEELS. ◁

One of our departments is specially adapted for the production of our Patent Steel Wheels and Axles for collieries, tramways, ironstone mines, slate quarries, ironworks, lead mines, &c., and we are now manufacturing 2000 per week. Owing to our patent system of fitting-up Wheels and Axles, which is simple but effective, we are enabled to execute orders with promptitude. We undertake to supply all work entrusted to us in a first-class manner, and only manufacture the best quality of material. Over 1800 DIFFERENT WHEEL, PULLEY, AND PEDESTAL PATTERNS IN STOCK, of varying widths of tread, flanges, &c., any of which can be ready for use at the shortest notice.

In addition to the now universally admitted superiority of Hadfield's steel wheels over those of cast-iron for lightness, strength, and wearing qualities, we claim the following SPECIALITIES for our material over any other steel, malleable iron, or other wheels, viz.:-

Extra TOUGHNESS or TENACITY, DURABILITY, and SOLIDITY; for proof of this kindly see advertisement marked "List No. 28."

N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, rail gauge, and thickness of axles, and rolling load.



We also solicit attention to the following articles, which, in addition to our well-known Patent Steel Wheels and Axles, we are now largely supplying in our CAST STEEL, on account of their great strength combined with durability and lightness.

**Rollers, Pulleys, Frames, and Stands.**—See our lists of over 240 different patterns. They possess great durability, lightness, and strength, and add considerably to the life of the steel or other ropes.

**Self-oiling Wheels (Patent).**—Many thousands now at work. Save at least 50 per cent. of oil or grease. Easily charged or refilled. Reduce friction and wear and tear to a minimum.

**Pedestals, Bushes, Cage Guides, Buffer Boxes, Points, Crossings, and other Colliery Castings** of every description.

Over 1700 different patterns of above in stock, ready for use on the shortest notice. New patterns made to suit special requirements free of charge for quantities.

**Steel Axles** to suit all classes of haulage. We manufacture a special mild quality of steel suitable for this purpose, and have many hundreds of thousands in daily use giving every satisfaction.

**Steel Gearing** of all kinds. Machine moulded or from full patterns.

**Miscellaneous Steel Castings**, up to 16,000 lbs. each, to replace expensive wrought-iron and steel forgings and heavy iron castings. Tensile strain of our castings 35 to 65 tons per square inch (as tested by Government) varying according to purpose required, with 20 per cent. elongation.

**Note.**—Beware of spurious and cheap imitations which eventually work loose, causing great loss and annoyance, as well as bringing discredit on the name of Steel Wheels and Axles. We are constantly replacing such. See, therefore, that Hadfield's name is on every wheel.

N.B.—Note the Address, and prove truth of the above by giving our Steel Wheels, &c., a trial.

**HADFIELD'S STEEL FOUNDRY COMPANY, HECLA WORKS, ATTERCLIFFE, SHEFFIELD.**

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## BERGEN PORT SPELTER.

Being the exclusive owners of All the Mines producing the famous LEHIGH ZINC ORES of the Lehigh Valley, Penn., which are the Purest in the World, making a Soft, Ductile Spelter, Free of Lead and Arsenic, superior in all respects to any other made, and especially adapted for the manufacture of

**Cartridge Metal, German Silver, Castings, AND ELECTRICAL PURPOSES.**

**BERGEN PORT ZINC CO.**

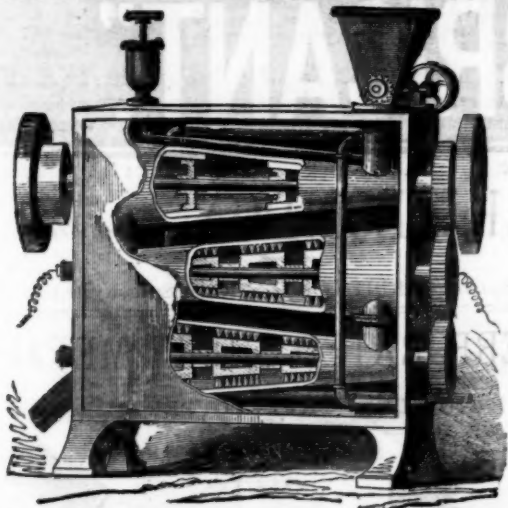
E. A. FISHER, Agent,

21, STATE STREET, Opposite Battery Park, NEW YORK.

## NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never needs stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each. The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel mullers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamic electro machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to inclined copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—  
1.—The saving of almost all the mineral passing through the machine.  
2.—The loss being less than 10 per cent.  
3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.  
By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Spary Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

PRINCIPAL OFFICE OF

**Prof. MANES and SONS,**  
No. 372, Glanarm Street, Denver, Colorado, U.S.A.

All our machines and furnaces are made by the Colorado Iron Company of Denver, Colorado, the most extensive mining machine works in America.

**PHILLIPS MONTHLY MACHINERY REGISTER—**  
THE BEST MEDIUM IN THE KINGDOM  
FOR THE  
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NEW OR SECONDHAND MACHINERY

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CHARLES D. PHILLIPS, NEWPORT MON.

## INCREASED VALUE OF WATER-POWER.

### MacADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

These Turbines are at work in nearly every county in England. Apply to—  
**MacADAM BROTHERS AND CO., BELFAST.**

Just ready, price 3s., cloth, New Edition (7th).  
**HOPKIN'S CONVERSATIONS ON MINES.** Much improved revised, and enlarged. With 300 questions to assist applicants to obtain Managers' Certificates.  
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MINING JOURNAL Office, 26, Fleet-street  
And all Booksellers.

**THE IRON AND COAL TRADES REVIEW**  
The IRON AND COAL TRADES REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron Coal, Hardware, Engineering, and Metal Trades in general. Offices of the Review: 342, Strand, W.C.  
Remittances payable to W. T. Pringle.

**THE COLLIERY READY-RECKONER AND WAGES CALCULATOR.**  
By JAMES S. IRELAND  
"Will be the means of preventing many disputes between pay clerks and colliers."—Mining Journal.  
To be had on application at the MINING JOURNAL Office, 26, Fleet-street, E.C.

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## CRUCIBLE STEEL CASTINGS

Of all descriptions of special strength and solidity.

ALSO, MANUFACTURERS OF  
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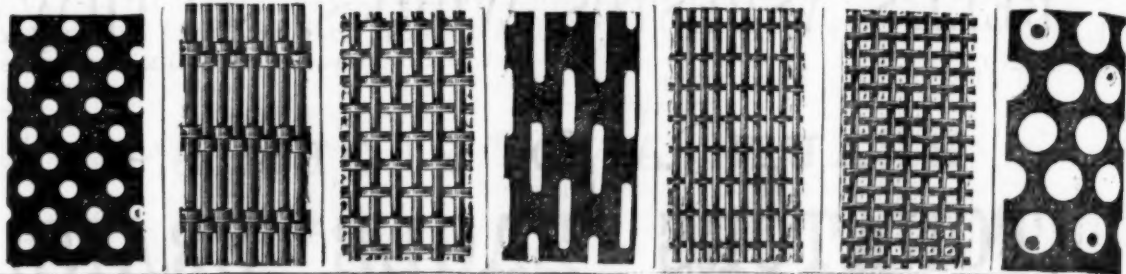
SOLE MAKERS OF

## R. MUSHET'S CELEBRATED EXTRA BEST TITANIC CAST STEEL FOR BORERS,

And of R. Mushet's special Steel for Lathe and Planing Tools and Drills,

THE STEEL WHICH REQUIRES NO HARDENING.

## CLYDE STEEL AND IRON WORKS, SHEFFIELD.



Extra Treble Strong Wire Cloth and Perforated Metals in Steel, Iron, Copper, Brass, Zinc, Bronze.

Made in all Meshes and Widths.

**N. GREENING & SONS, Limited,**  
Wire Manufacturers and Metal Perforators,  
**WARRINGTON.**

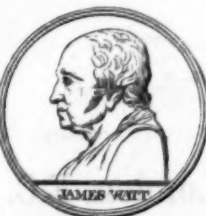
Jigger Bottoms, Trommels, Cylinder Covers, Riddles, Sieves for Diamond, Gold, Silver, Copper, Lead and Tin Mines.

Samples and Prices free on application.

ESTABLISHED A CENTURY.

ROYAL CORNWALL POLYTECHNIC SILVER MEDAL.

"MINING JOURNAL" £20 SPECIAL PREMIUM.



**FRANCIS DINGLEY AND SON,**

INVENTORS AND PATENTEES OF IMPROVED

## Mine Dressing, Pumping, & Winding Machinery,

**WATER WHEELS,**

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**PULVERIZERS,**

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**MILLWRIGHTS' AND**

**ASSAYERS' REQUISITES.**

Combining all the latest improvements, which they have made their study for many years.

**PUMPING AND WINDING ENGINES AND BOILERS FOR SALE.**

**MINES SURVEYED** for Machinery, and Plans and Estimates submitted on application to

**FRANCIS DINGLEY AND SON, Engineers and Ironfounders,**  
"Truro Foundry," Truro, Cornwall.



# BELL'S ASBESTOS.

**BELL'S PATENT ASBESTOS BLOCK PACKING**, for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlay. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

**BELL'S ASBESTOS BOILER PRESERVATIVE.** This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that ¼ in. thick of incrustation causes a waste of 15 per cent. of coal; ½ in., 60 per cent.; ¾ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING**

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—  
Festiniog Railway, Locomotive Superintendent's Office,  
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.  
DEAR SIR,  
I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.  
Yours truly,  
(Signed) W. WILLIAMS.

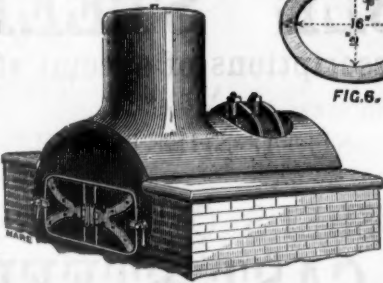


FIG. 5.



FIG. 6.



FIG. 1.

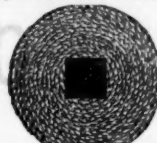


FIG. 2.

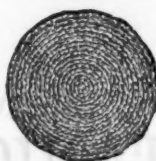


FIG. 4.

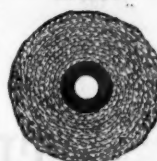


FIG. 3.

**BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION**, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.  
" " Covering - - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—  
Offices of the Wimbledon Local Board, Wimbledon,  
Nov. 25th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel through using your covering.—Yours truly,  
W. SANTO CRIMP, C.E., F.G.S.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING**, for making every class of Steam and Water Joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ¼ in. (Fig. 6) to 3 in. wide, and any thickness from ¼ in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD**, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1/64th in. to 1 in., and ¼ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

**BELL'S ASBESTOS EXPANSION SHEETING (PATENT).**

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

## BELL'S "ASBESTOS LUBRICANT"

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

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Victoria Buildings, Deansgate, MANCHESTER.

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## BRAUN AND BLOEM'S CELEBRATED DETONATORS—"EAGLE" BRAND.

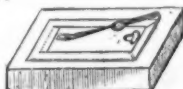
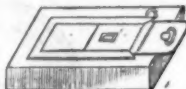
TRADE



MARK.

The most powerful Percussion Caps for exploding Dynamite, developing its fullest strength.  
PACKED IN THEIR PATENT TIN BOXES.

PATENT No. 3665



A new invention, doing away with the very dangerous operation generally in use of inserting cutting tools when it is necessary to open the outer tin box.

Sold by **WM. BRODERSEN, 79, Leadenhall-street, London, E.C.**  
SOLE AGENT FOR THE UNITED KINGDOM AND THE COLONIES.

## BAXTER'S PATENT KNAPPING STONE BREAKER.

THE LAST FOUR MEDALS AWARDED FOR STONE BREAKERS,



1881.



FACTS SPEAK FOR THEMSELVES.

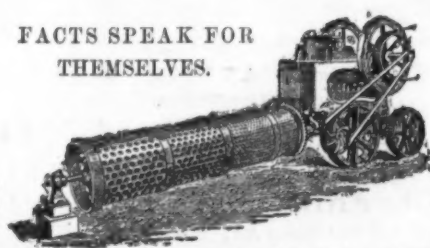


1881.



Our Machine, tested by the Judges at Calcutta, broke 7 tons in 45 minutes to 2½ in. ring, and was awarded First Class Certificate and Gold Medal in competition with the Blake Machine.

The ONLY MACHINE which has never failed to do what it was guaranteed, and is also the ONLY MACHINE which has never had a driving shaft broken or the end sent out.



See our Machines now being exhibited at the Crystal Palace, London.

We shall be glad to receive any kind of stone ore or other material to be broken or crushed at Shrewsbury Royal Show, Stand No. 247, in July, either by our Breaker or New Patent Fine Crusher.

We also exhibit at the Highland Show at Edinburgh in July.

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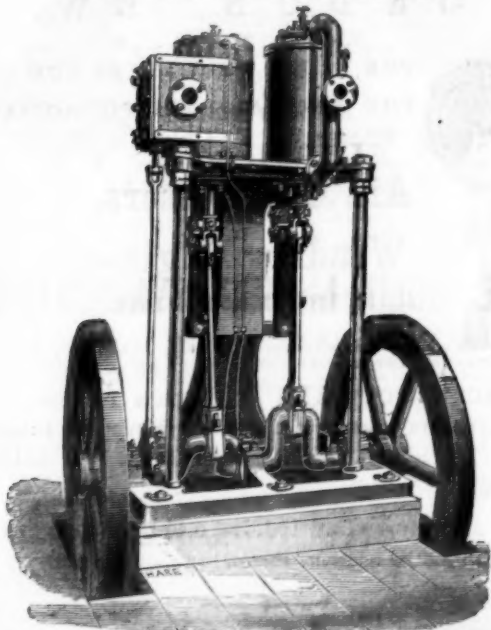
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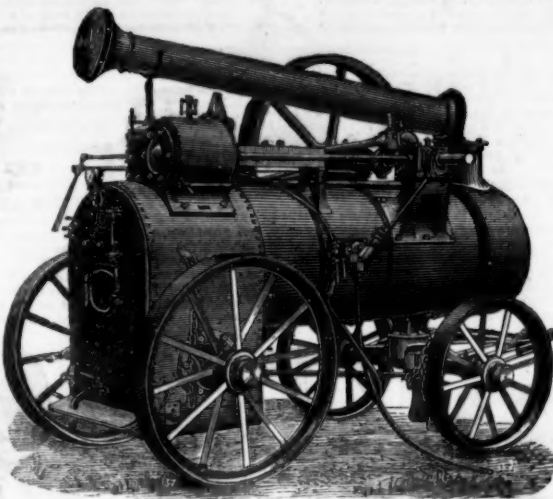
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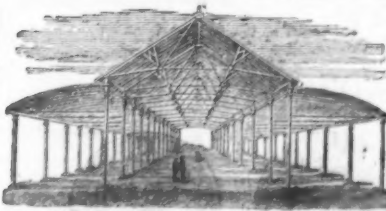
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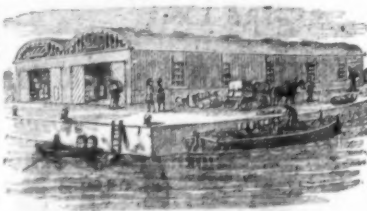


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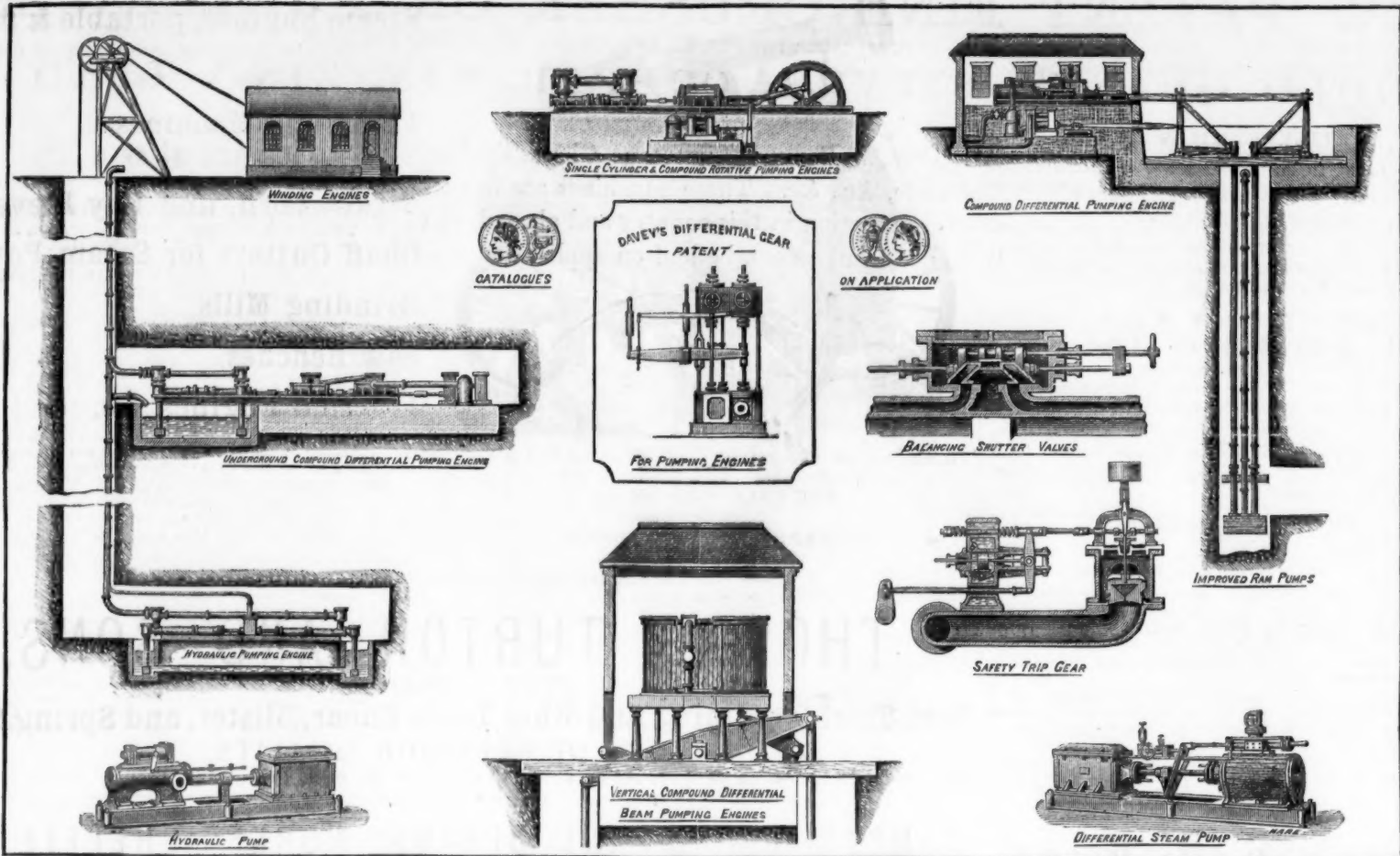
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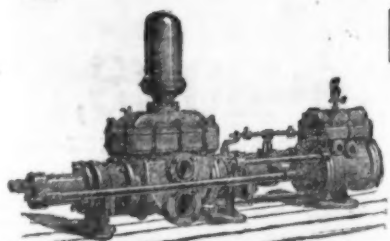
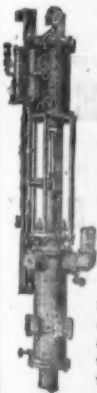
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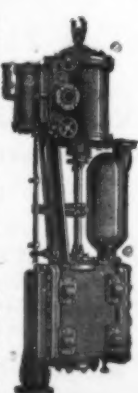
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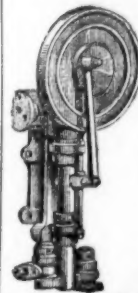
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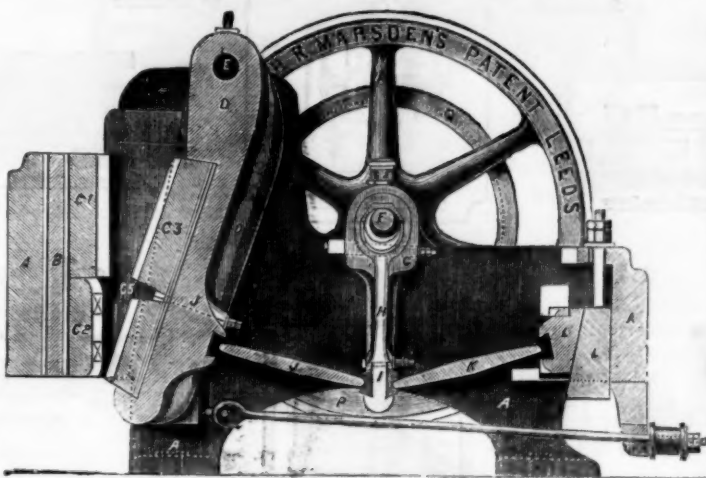
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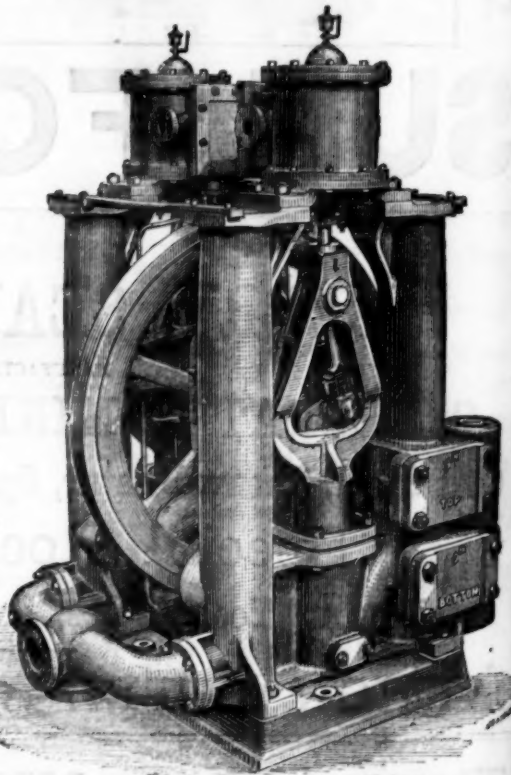
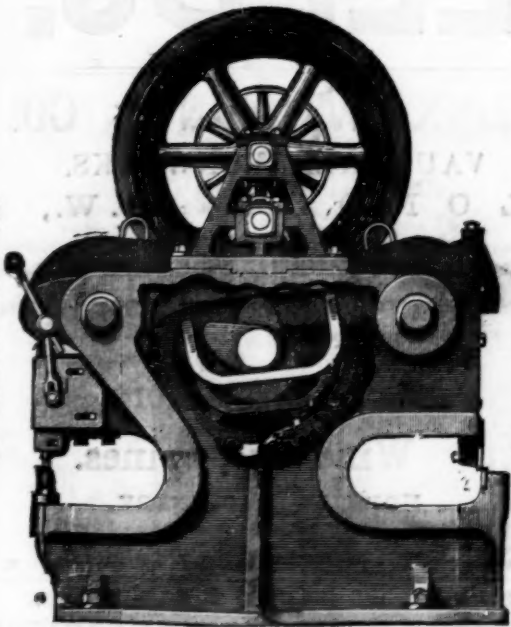
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